Creighton University
College of Arts & Sciences

15th Annual Honors Day

Program of Research Presentations

10 April 2019
2:00-5:00 pm
Harper Center, 3rd Floor

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Welcome from the Dean

Welcome to Honors Day 2019.

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 2019 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 mechanisms of gene silencing, Ignatian spirituality, and global variance in freedom of the press. 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 pm	3027	Mary Kate Wolken	"Public Spaces, Public Health, and the Public Good: Spanish Medical Culture and the Junta de Damas de Honor y Mérito"
2:05 pm	3029	Molly Bohannon	"Media Bias in Headlines: Is Neutrality an Option or is Bias Inevitable?"
2:30 pm	3027	Garret Fox	"Forces in Relation: Humans and Mechanisms in the Omaha Community Bike Project"
2:30 pm	3029	Aurora Kuhn	"Full Ministerial Inclusion: The Argument for Women's Ordination in the Catholic Church"
2:55 pm	3027	Tyler Wikoff	"Identification and Characterization of Long Repeat Sequences - Drivers of Genome Plasticity within the Candida albicans Genome"
2:55 pm	3029	Samantha Manella	"From the Pages to the Path: The Pilgrimage of Life"
3:20 pm	3027	Mitchel Pham	"Influence of Hand-Polished CAD/CAM Zirconia on Gingival Fibroblast Adhesion"

Time:	Room:	Presenter:	Title:
3:20 pm	3029	Brandon Calderon	"Academic Service Learning as a Means of Social Efficiency"
3:45 pm	3027	Jessica Sandcork	"Data Reduction on High-Dimensional Data Sets Using Principal Component Analysis (PCA)"
3:45 pm	3029	Jaxson Schneider	"Ignatian Spirituality in *Infinite Jest*: Discerning Through the Times' Darkness"

Poster Presentation Schedule

Time:	Room:	Presenter:	Title:
2:05 pm	3023	Emilia Berni	"Optimized Sol-gel Derived Si-based Nanoparticles for Use in Luminescence-based Chemical Sensing"
2:05 pm	3023	Noah Brady	"Modeling gHAT in the DRC"
2:05 pm	3023	Philip Bui	"Work Towards an Electrogenerated chemiluminescence -DNA Biosensor Labeled with a Ruthenium Complex"
2:05 pm	3023	Richard Cassidy	"Integration and Comparison of Fluorescence Labeled Spindle Pole Body Protein Components from K. lactis into S. cerevisiea"
2:05 pm	3023	Margaret Glick	"Dual Stress Warm-Up Protocol Significantly Alters Blood Glucose Concentration"
2:05 pm	3023	Morgan Hamersky	"Self-administration of d-amphetamine on IRT>T Schedule"
2:05 pm	3023	Jacqueline Ramos	"Rheological Study of Dental Materials Containing Microcapsule Fillers"
2:05 pm	3028	James Cross	"ATox1 and DNMT1 Interactions"
2:05 pm	3028	Rohan Das	"Rapid Qualitative Colorimetric Viability Analysis of Planctomycetes"

Time:	Room:	Presenter:	Title:
2:05 pm	3028	Brad Dawson	"Genetic Basis for Adaptation to Novel pH in Experimental Lines of Escherichia coli"
2:05 pm	3028	Sabrina DuMond	"Pollen Tube Development in Water-pollinated Stuckenia pectinata"
2:05 pm	3028	Cameron Kell	"A Novel Approach to Metagenomic Analysis of Lotic Habitats"
2:05 pm	3028	Andrea Laudi	"The Relationship Between Neonatal Encephalopathy and Maternal Postpartum Depression"
2:05 pm	3028	Brady Manker	"Amygdala, Hippocampal, and Parahippocampal Volumes Vary by Sex and Traumatic Life Events in Healthy Children"
2:05 pm	3028	Robyn Scott	"Mapping the Binding Sites for CAF-1 on PCNA"
2:55 pm	3023	Morgan Dobersek	"The Cultural Barriers Faced by Immigrants and Refugees in the United States Legal System, with an Emphasis on the Relationship Between Immigrants and the Legal System in Omaha, NE"
2:55 pm	3023	Jack Barry	"Immigration and the Courts: Examining the Impact of Ideology on Sentencing"

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2:55 pm	3023	Kathleen Bever	“Enacting Paid Family and Medical Leave Policy: A Quantitative Analysis Across the American States”
2:55 pm	3023	Carly Rademacher	“Inclusionary Exclusion: The Economics of Inclusionary Zoning Policies”
2:55 pm	3023	Sahil Sandhu	“Ancient Fertility Worship in the Mediterranean: An Investigation of a Stele of Bes from the Joslyn Art Museum”
2:55 pm	3023	Gillian Straub	“Explaining Global Variance in Freedom of the Press”
2:55 pm	3028	Maddie Fung	“Anxiety is Adaptive? The Evolution of the Stress Response”
2:55pm	3028	Kaitlin Carlson	“Effect of a Ballet and Jazz/Tap Dance Class on Heart Rate Variability in Advanced Collegiate Dancers”
2:55 pm	3028	Kathleen Resman	“Do T-cells Need Friends? Does Diversity of Culture Matter?”
2:55 pm	3028	Kaitlin Marley	“Altering Human Behavior to Improve Animal Health”
2:55 pm	3028	Cameron Nielson	“Math Accessibility for the Visually Impaired (MAVI)”

Time:	Room:	Presenter:	Title:
2:55 pm	3028	Allison Quady	"Comparing the PAI and the M – FAST in their Ability to Assess Response Style"
2:55 pm	3028	George Varghese	"Frequency of Post-procedural Echocardiograms in Catheter-mediated Patent Ductus Arteriosus Closure is Greater Than After Surgical Closure"
2:55 pm	3028	Nicolas Villarraga	"Combined Influence of Subsytolic Circulatory Occlusion and Pedal Frequency on Cardiovascular Responses During Exercise in Younger and Older Adults"
2:55 pm	3028	Braden Oldham	"Probing Astrocyte Function in Fragile X Syndrome Using Human Pluripotenet Stem Cell-Derived Astrocytes"
3:45 pm	3023	Rachel Melchionna	"Methods of Inducing Alveolar Bone Loss: A Comparative Analysis"
3:45 pm	3023	Shilpa Nair	"Segmental Aneuploidies Flanked by Inverted Repeats Cause Azole Resistance in the Fungal Pathogen Candida albicans"
3:45 pm	3023	Dillon Nerland	"Using Microphonic Assays to Analyze Otolith Attachment in Zebrafish"

Time:	Room:	Presenter:	Title:
3:45 pm	3023	Mason Halouska	“The Causal Relationship Between Primary and Expected Source of Payment and Patient Waiting Times in Healthcare”
3:45 pm	3023	Brendan Rezich	“Identification of Small Molecule Inhibitors of Detrimental TREM-1”
3:45 pm	3023	Anna Rossini	“Randic and Wiener”
3:45 pm	3028	Erin Budesheim	“Mediation Model of Mental Health Stigma and Self-Esteem in a College Sample”
3:45 pm	3028	Hana O’Hagan	“Metal Ion Concentration Analysis of Water from Lima, Perú”
3:45 pm	3028	Erika Ruhnke	“Religiosity as a Moderator of Mental Health Difficulties and Life Satisfaction”
3:45 pm	3028	Kaylee Schwasinger	“Linking Immune Dysfunction and Autism Spectrum Disorder through Mutations in KMT5B and SMC3”
3:45 pm	3028	Mark May	“The Dimerization of CAF-1”
3:45 pm	3028	Matthew Seikel	“The Characterization of Fullerols Using MALDI Spectrometry”

Time:	Room:	Presenter:	Title:
3:45 pm	3028	Srishti Singal	“Improved Aqueous Solubility of Novel Antimycobacterial Indole-2-carboxamides through Complex Formation with Cyclodextrins”
3:45 pm	3028	Andrew Walther	“Correlation Between a Deep-learning-based Model Observer and Human Observer for a Realistic Lung Nodule Localization Task in Chest CT”

Schedule of Speakers

Welcome and Introduction 2:00 pm, 3023
Dr. Erin Walcek Averett
Associate Director of the Honors Program

Closing Ceremony
Introduction to the Dean 4:30 pm, 3023
Dr. Erin Walcek Averett
Associate Director of the Honors Program

Congratulations from the Dean 4:35 pm, 3023
Dr. Bridget Keegan
Dean of the College of Arts and Sciences

Congratulations from the Provost 4:45 pm, 3023
Dr. Thomas F. Murray
Provost of Creighton University

Congratulations from the President 4:55 pm, 3023
Rev. Daniel S. Hendrickson, S.J.
President of Creighton University

Closing Remarks 5:00 pm, 3023
Dr. Jeffrey Hause
Director of the Honors Program

Abstracts

alphabetical by last name

Jack Barry

Majors: Political Science, International Relations
Faculty Sponsor: Dr. Scott Hendrickson
2:55 pm | Harper 3023

"Immigration and the Courts: Examining the Impact of Ideology on Sentencing"

This study examines the impact of ideology on sentence length in federal immigration cases. I hypothesize that sentence length will increase when the ideology of the district court is conservative, when Donald Trump is President and when the ideology of the court and the President are both conservative. This study employs a series of OLS regressions and uses data from the United States Sentencing Commission Individual Offender Datasets and Federal Court Ideology data for fiscal years 2016-2017. Findings indicate a statistically significant relationship between sentence length and the three independent variables. The relationship is positive between both district court ideology and during the Trump presidency. Notably dramatic increase in sentence length was observed when both the President and the district court ideologies are conservative. This study adds to the existing literature on judicial discretion by using ideology as a key explanatory variable to determine sentence length.

Emilia Berni

Majors: Biomedical Physics, Chemistry
Faculty Sponsor: Dr. Joel Destino
2:05 pm | Harper 3023

"Optimized Sol-gel Derived Si-based Nanoparticles for Use in Luminescence-based Chemical Sensing"

Over the past several decades, there have been numerous reports of chemically tailored Si-based luminescent nanoparticles for use in chemical detection. Many of these protocols require hazardous reagents such as hydrofluoric acid and sodium borohydride, or expensive equipment for vapor-phase synthesis. Recently, there have been reports of greener sol-gel derived luminescent nanoparticles using

ascorbic acid and 3-aminopropyltriethoxysilane (APTES). Building off of this work, we report an optimized method for preparing sol-gel derived luminescent nanoparticles with potential use in chemical sensing. Optimization was determined by several factors, namely, emission intensity, shelf-life, and photostability. These particles have been characterized by luminescence spectroscopy, AFM ,and FTIR. Results show that these particles are 4 nm in diameter, with a $\lambda_{ex,max}$ = 400 and $\lambda_{em,max}$= 440. Ongoing studies include surface functionalization through silanization and characterization of these nanoparticles for detecting analytes in solution.

Kathleen Bever

Major: Political Science
Faculty Sponsor: Dr. Erika Moreno
2:55 pm | Harper 3023

"Enacting Paid Family and Medical Leave Policy: A Quantitative Analysis Across the American States"

Paid family and medical leave is a topical policy debate in the United States. The Family and Medical Leave Act of 1993 guarantees unpaid, rather than paid, family and medical leave insurance. As a result, six American states and the District of Columbia have enacted their own paid family and medical leave policies since 2002. This research identifies the influences of policy diffusion, women's representation in state legislatures, party composition of state legislatures, and state gross domestic product on the likelihood of the enactment of paid family and medical leave policies. Findings indicate that party composition and gross domestic product are significant predictors of policy enactment. As paid family and medical leave policy continues to occupy political discourse, this research can aid in understanding influences on policymaking in American state legislatures.

Molly Bohannon

Majors: English, Journalism: News Track
Faculty Sponsor: Dr. Matthew Reznicek
2:05 pm | Harper 3029

"Media Bias in Headlines: Is Neutrality an Option or is Bias Inevitable?"

Media was under fire like never before following the 2016 election. Claims of "fake news" and attacks on "liberal media" riddled the internet, some stemming from President Trump. The sheer presence of these claims presents an important question to the American news consumer: is media bias more present now than ever? By studying headlines from outlets with different politically aligned audiences on key dates in the election, I sought to prove the presence of a media bias regardless of the ideology of audience. I also sought to understand the differences between objectivity and neutrality and implications of attempted neutrality. Through analysis of connotation, strength and relevance of language, I drew my conclusion: the approach, not the outcome, is what should be objective. It is possible for a source to be neutral in approach and contain the appearance of bias due to the need to please an audience and remain relevant.

Noah Brady

Major: Chemistry
Faculty Sponsor: Dr. Rebecca Gasper
2:05 pm | Harper 3023

"Modeling gHAT in the DRC"

How can we reduce the transmission of a lethal parasite between humans and tsetse flies? We use a combined SIS-LSEI model to analyze gambiense Human African Trypanosomiasis (gHAT), calculate the basic reproduction number R_0 and perform a sensitivity analysis. Novel aspects include accounting for vertical transmission in humans and the transmission index of Trypanosoma brucei in tsetse flies. We find that with nominal parameters, $R_0 < 1$, but increases in contact number and transmission index cause $R_0 > 1$. We determine small changes that make a big difference in the progression of an epidemic: decreasing the contact number and decreasing the duration with improved screening/diagnosis. We advise policy change, emphasizing inexpensive screening tools, mobile doctors, DEET, and

Permethrin to reduce death and unnecessary suffering caused by African sleeping sickness in the Democratic Republic of Congo.

Erin Budesheim

Major: Psychology
Faculty Sponsor: Dr. Alicia Klanecky
3:45 pm | Harper 3028

"Mediation Model of Mental Health Stigma and Self-Esteem in a College Sample"

Corrigan et al. (2014) suggested that stigma prevents up to 40% of individuals with mental health problems from seeking treatment. For example, in one study, 19% of participants reported not seeking mental health treatment due to embarrassment (Schuler, 2015). The current study sought to examine the relationship between personal and self-stigmas on self-esteem. Our findings from a previous study indicated levels of stigma may differ based on treatment history. Present analyses used a mediation moderation model to look at the relationship among these stigmas in relation to treatment history, effectiveness, and self-esteem measures.

Philip Bui

Major: French and Francophone Studies
Faculty Sponsor: Dr. Erin Gross
2:05 pm | Harper 3023

"Work Towards an Electrogenerated Chemiluminescence -DNA Biosensor Labeled with a Ruthenium Complex"

Electrogenerated chemiluminescence (ECL) based biosensors combine the high sensitivity of a luminescence biosensor with the low cost and miniaturization capabilities of an electrochemical biosensor to create electrochemical, folding-based DNA biosensors that offer fast, sensitive and selective nucleic acid detection. We observed the ECL signal to decrease (signal-off sensor) in the presence of 2-μM K-ras DNA target, or analyte. The sensors did not respond the same when the wrong DNA target sequence was added, demonstrating some specificity. This study also compared the response of the sensors in the presence of two different co-reactants and optimized the stability of the sensors.

Brandon Calderon

Major: Philosophy – Ethics Specialization
Faculty Sponsor: Dr. Amy Wendling
3:20 pm | Harper 3029

"Academic Service Learning as a Means of Social Efficiency"

In this study, we advocate for a form of service learning within a local youth prison facility as a means of pursuing social efficiency as described by John Dewey. This experience provides upper-level interdisciplinary students the opportunity to improve their understanding of philosophical theory while exposing them to the carceral system. This project benefits students in multiple ways. First, the project successfully alienates students from their assumptions about modern imprisonment. Second, the project allows students to meet with incarcerated persons of a similar age and geographic proximity. The similarities between students and incarcerated persons typically creates an environment conducive to philosophical conversation. Allowing students to become the teachers of philosophic theory enables them to solidify their grasp of the concepts. Finally, the relationship of both the incarcerated persons and students successfully highlights the disparities in socioeconomic status between students and incarcerated individuals.

Kaitlin Carlson

Major: Exercise Science & Pre-Health Professions
Faculty Sponsor: Dr. Rohan Edmonds
2:55 pm | Harper 3028

"Effect of a Ballet and Jazz/Tap Dance Class on Heart Rate Variability in Advanced Collegiate Dancers"

Heart rate variability (HRV), a valid and reliable measure of cardiac autonomic function, has been used in previous research to examine how dancers respond to typical workloads in preparation for a concert performance. It is apparent that dancers respond in a comparable manner to athletic populations leading up to competition, exhibiting a decrease in vagal modulation prior to a dance performance. The aim of this study was to document the acute HRV responses following a typical dance class period. HRV responses were documented over the course of 7-weeks in a cohort of collegiate Dance minor students.

Richard Cassidy

Major: Biology
Faculty Sponsor: Dr. Ann Cavanaugh
2:05 pm | Harper 3023

"Integration and Comparison of Fluorescence Labeled Spindled Pole Body Protein Components from K. lactis into S. cerevisiea"

Cellular division relies on the concept that the daughter cell will inherit genetic material from the mother. In yeast, the spindle pole body (SPB) organizes the microtubules required for DNA segregation into the daughter cells. The SPB is a complex array of multiple protein types occurring at various frequencies throughout the structure. This project uses two closely related yeast species (S. cerevisiae and K. lactis) to explore the evolutionary relationship between individual proteins in the SPB and how they relate to the function of the protein complex as a whole. We fluorescently labeled the various components of the SPB in K. lactis then integrated them into S. cervisiae knockouts for the corresponding protein. The clones were then compared using confocal microscopy to determine the location and relative concentration of the integrated proteins.

James Cross

Major: Neuroscience
Faculty Sponsor: Dr. Chandra Boosani
2:05 pm | Harper 3028

"ATox1 and DNMT1 Interactions"

Antioxidant-1 (Atox1), a metalloprotein, is a copper (Cu) chaperone in the human body. Its functions include chelating potentially toxic levels of intracellular Cu and ensuring the metal's pairing with Cu dependent reactions. The protein also possesses pathological implications. A factor in both atherosclerosis and cancer, Atox1 contributes directly to excessive cellular proliferation and angiogenesis. Both of these are particularly significant in atherosclerosis, and specifically, Atox1's relationship with the epigenetic agent DNA methyltransferase-1 (DNMT1) holds serious therapeutic potential. Our work focused on the relationship between intracellular Atox-1 levels and its relationship to various concentrations of metals.

Rohan Das

Major: Biology
Faculty Sponsor: Dr. Josef Franke
2:05 pm | Harper 3028

"Rapid Qualitative Colorimetric Viability Analysis of Planctomycetes"

The phylum Planctomycetes of the domain bacteria consists of several species with atypical membrane organization for Gram-negative bacteria. As such, Planctomycetes have drawn interest in areas of evolutionary cellular biology research. Planctomycetes exhibit slow growth rates, susceptibility to contamination, and variable viability under different growth conditions, which present challenges for ongoing studies. Colorimetric vital dyes have not been commonly utilized to determine viability in bacteria. However, given the atypical membrane features of Planctomycetes, our study hypothesized that live-dead dye incubation techniques might be effective for qualitative viability analysis. The study employed three colorimetric vital dyes, trypan blue, methylene blue, and erythrosin B, for numerous Planctomycetes. Cell counts and imaging of the assays determined if particular dyes could serve as generalized indicators of viability across the Planctomycetes phylum. The findings of this study provide a rapid and cost-effective method for determining viability in Planctomycete cultures.

Brad Dawson

Major: Biology
Faculty Sponsor: Dr. Alistair Cullum
2:05 pm | Harper 3028

"Genetic Basis for Adaptation to Novel pH in Experimental Lines of Escherichia coli"

We have six lines of Escherichia coli that were all propagated for 2,000 generations from a common ancestor previously adapted to a pH 7.2 environment. Three of these lines were evolved for 2,000 generations in an environment with a pH of 5.2; the other three lines were evolved in an environment with a pH of 7.8. Each of the lines evolved at a pH of 5.2 showed increased fitness in this environment, with only two of the three showing a significant decrease in fitness in alkaline environments compared to the ancestor. All three lines evolved at 7.8

also showed increased fitness in this alkaline environment, but all three showed a fitness tradeoff for living in acidic environments. We sequenced the complete genomes of all six evolved lines and their common ancestor, finding 2-5 mutations in each line. Here we present a comprehensive list of genetic mutations found in each.

Morgan Dobersek

Majors: Sociology, Musical Theatre
Faculty Sponsor: Dr. Dawn Irlbeck
2:55 pm | Harper 3023

"The Cultural Barriers Faced by Immigrants and Refugees in the United States Legal System, with an Emphasis on the Relationship Between Immigrants and the Legal System in Omaha, Nebraska"

Certainly, there is a relationship between immigrants, refugees, and the legal system. However, this relationship is frequently burdened with barriers, such as difference in culture, the lack of a shared language, and non-traditional documentation statuses. What exactly can the legal system provide to help improve the representation for immigrants and refugees? This research took a deeper look into the connection between the legal system; those who assist families, such as social workers; and immigrant and refugee families in the Omaha, Nebraska area and what is needed to strengthen the connection and lessen the barriers for immigrant and refugee families.

Sabrina DuMond

Major: Biology
Faculty Sponsor: Dr. Mackenzie Taylor
2:05 pm | Harper 3028

"Pollen Tube Development in Water-pollinated Stuckenia pectinata"

Hydrophily, known as water pollination, is known to be correlated with certain pollen traits, but little is known about the consequences of the transition to hydrophily for post pollination development. In this study, characteristics of the life history stage between pollination and fertilization of the water-pollinated plant, Stuckenia pectinata, were examined. Flowers of Stuckenia p. were hand pollinated and then collected at specific time intervals. The flowers were stained with

aniline blue dye, observed under a light microscope, and imaged. The germination status of each pollen grain was documented, and the length of the longest pollen tube was measured. The timing of stigma receptivity, pollen reception and germination, as well as ovule entry was documented. A final pollen tube growth rate was calculated for the species using the length of the longest pollen tube and time to germination.

Garret Fox

Majors: Environmental Science, English, Sustainability
Faculty Sponsor: Dr. Joshua Prenosil
2:30 pm | Harper 3027

"Forces in Relation: Humans and Mechanisms in the Omaha Community Bike Project"

Podcasts provide a unique opportunity to engage and expose a broad array of individuals to new and nuanced ideas. This project will utilize the medium to track sociological themes as demonstrated within the Omaha Community Bike Project. The primary themes of interest will be the relationship of individual persons/parts to larger organizations/machines, the relationship between persons and machine, and the transformation of identity between contexts. Justification and evidence of these themes will be provided through both on-site interviews and narrative explanation of sociological theory. Rather than structure and name these themes expressly, the podcast will incorporate the more analytical components into a creative, heavily metaphoric design. In doing so, it is the goal of this piece to make both the Community Bike Project and its underlying sociology knowable to more distant audiences.

Maddie Fung

Major: Biology
Faculty Sponsor: Dr. Theodore Burk
2:55 pm | Harper 3028

"Anxiety is Adaptive? The Evolution of the Stress Response"

Fear is widely conserved across the animal kingdom – it is an emotion that aids survival, so it continues to persist throughout evolutionary

history. The stress response originally arose as a defensive mechanism against external threats, specifically predators and threatening conspecifics, which increases an individual's chances for survival. However, the modern environment increases the potential for this adaptive system to go awry. Humans use the same fear response to deal with prolonged psychological stressors, which can overstimulate this system. In anxiety disorders, excessive activation of fear mechanisms shows how adaptive processes can become pathological. However, the adaptive advantages of these original mechanisms continue to outweigh the associated health consequences, so stress and anxiety disorders continue to persist through human evolutionary history. Therefore, anxiety is adaptive, it is just not ubiquitously beneficial to modern humans

Margaret Glick

Major: Physics
Faculty Sponsor: Dr. Jake Siedlik
2:05 pm | Harper 3023

"Dual Stress Warm-Up Protocol Significantly Alters Blood Glucose Concentration"

The purpose of this study was to determine whether a dual stress warm-up protocol significantly alters circulating glucose concentrations before and after a Wingate Anaerobic Test (WAnT). Subjects completed two Wingate Anaerobic Tests (WAnT) separated by at least 3 days but no more than 1 week, preceded by either a 5 min warm-up (CTRL) or the same warm-up while also completing the Paced Auditory Serial Test (EXPT). Blood glucose draws were taken at 5 time points in both trials. Diet was standardized. Glucose concentrations significantly increased at 5 min post WAnT for both conditions and were higher during EXPT.

Mason Halouska

Major: Economics
Faculty Sponsor: Dr. Kristie Briggs
3:45 pm | Harper 3023

"The Causal Relationship Between Primary Expected Source of Payment and Patient Waiting Times in Healthcare"

With the aging population of the United States, access to healthcare is an increasingly important concern. However, it is not clear how access to healthcare is determined. This project aims to determine and isolate the effect of patients' expected primary source of payment for medical services on patients' access to healthcare services. Through the use of basic and advanced econometric regression techniques, this study demonstrates how different payment sources have different effects on patient waiting times for healthcare appointments. Above all, the study identifies unexpected differences in patient waiting times between Medicare insurance and other common forms of payment. With the use of a number of control variables, this study isolates these relationships and suggests future studies for further clarification. Overall, this will allow the project to contribute to the knowledge and conversation around the debate over individual healthcare access and to suggest potential next steps for policymakers.

Morgan Hamersky

Major: Neuroscience
Faculty Sponsor: Dr. Dustin Stairs
2:05 pm | Harper 3023

"Self-administration of d-amphetamine on IRT>T Schedule"

On an IRT>T schedule, animals are trained to press a lever and wait a specific amount of time before pressing again. If the animal inhibits the pressing behavior for the correct amount of time, it receives a reinforcer. As drug abuse and impulsivity are correlated, self-administered intravenous doses of drug as reinforcement should alter performance on this behavioral inhibition task. We demonstrate an animal model of drug abuse using self-administered amphetamine drug in rats on an IRT>T schedule of reinforcement can be established, and levels of drug intake are sensitive to dosage shown in an inverted U-shaped dose-effect curve.

Cameron Kell

Majors: Math, Biology
Faculty Sponsor: Dr. Charles Brockhouse
2:05 pm | Harper 3028

“A Novel Approach to Metagenomic Analysis of Lotic Habitats”

The analysis of environmental DNA is emerging as a crucial tool in the understanding of natural systems. DNA sequences from lakes can be extracted with great success. It is difficult to produce similar results in lotic habitats, because the environment is constantly "moving away," preventing the build-up of eDNA. Larvae collect particulate and dissolved organic material. By isolating and sequencing DNA from the stomach contents, an overview of what lived in and near the water source is created. We present microbe sequences from lotic habitats and discuss the problems with data analysis and identification confidence.

Aurora Kuhn

Majors: Theology, Psychology
Faculty Sponsor: Dr. Nicolae Roddy
2:30 pm | Harper 3029

“Full Ministerial Inclusion: The Argument for Women's Ordination in the Catholic Church”

Women’s Ordination is a hot-button issue in the Catholic Church, and one that bears further academic and theological analysis. By incorporating Feminist Biblical Scholarship and scriptural evidence, an examination of the tradition of ordained ministers in Christianity, and an analysis of the arguments against women’s ordination put forth in recent Papal Encyclicals, I will argue that the exclusion of women from the ministerial priesthood has no legitimate basis. Therefore, the Catholic Church, in light of this evidence, should re-evaluate its teachings regarding women’s ordination and rectify them in order to allow women the opportunity to become priests.

Andrea Laudi

Major: Biology
Faculty Sponsor: Dr. Mark Reedy
2:05 pm | Harper 3028

"The Relationship Between Neonatal Encephalopathy and Maternal Postpartum Depression"

Neonatal hypoxic ischemic encephalopathy (HIE) is brain injury resulting from insufficient oxygen and blood supply. The standard treatment for HIE is therapeutic hypothermia, which involves a 72-hour period of hypothermia, where the infant is isolated from his/her parents. The primary objective of this study was to assess the effects of neonatal encephalopathy and the subsequent mother-infant separation on rates of maternal postpartum depression (PPD) compared to mothers of other hospitalized infants. Associations between EPDS scores and disease severity, outborn status, insurance type, and marital status were also assessed. The study found no association between the latter four variables and EPDS scores. A trend toward higher EPDS scores was noted in mothers of infants with HIE versus other admission diagnoses (21% vs. 10%, p=0.09). These findings support the need for universal depression screening with consideration for ways to reduce stress and improve the bonding experience during and after therapeutic hypothermia.

Samantha Manella

Major: Psychology
Faculty Sponsor: Dr. Ryan Spangler
2:55 pm | Harper 3029

"From the Pages to the Path: The Pilgrimage of Life"

Before Dante began his journey through the Inferno, he came across three beasts: a lion, a wolf, and a leopard, representing pride, avarice, and lust respectively. They forced Dante back into the dark forest, a metaphor for sin, that he was formerly trying to escape. Through this encounter, he came to understand the necessity of trials for human growth and the physical, mental, and spiritual challenges that one will experience during a pilgrimage. The purpose of this essay is to examine the various ways in which literature intertwines with the culture that surrounds the Camino de Santiago and pilgrimage as a whole.

Brady Manker

Major: Neuroscience
Faculty Sponsor: Dr. Amy Badura-Brack
2:05 pm | Harper 3028

"Amygdala, Hippocampal, and Parahippocampal Volumes Vary by Sex and Traumatic Life Events in Healthy Children"

Past studies show that exposure to trauma has been associated with smaller limbic region structures in adulthood, but little research has explored the effect trauma and sex differences have on children's limbic region volumes. 72 healthy children were separated into high trauma (4+ traumatic events) and low trauma (0-1 traumatic events) groups. Their amygdala, hippocampal, and parahippocampal volumes were recorded using MRI imaging. The sex by trauma interaction ($p=.016$) indicated that girls with high trauma had larger limbic volumes than boys with high trauma, specifically in the bilateral hippocampal and parahippocampal regions. This finding contradicts the decrease in volumes found in adults, suggesting an important differentiation in child neural development in response to trauma. The exact mechanism for changes in the neurodevelopment of children who experienced trauma is still unknown.

Kaitlin Marley

Major: Biology
Faculty Sponsor: Dr. Theodore Burk
2:55 pm | Harper 3028

"Altering Human to Improve Animal Health"

Because zoo animals have limited space for exercise and receive foods with more sugar than their natural diets, obesity is a common health issue for them. This problem is exacerbated when zoo visitors provide extra, unhealthy food to the animals. In 2011, the Henry Doorly Zoo conducted a study to determine how much extra food a group of spider monkeys received in a week; the excessive amounts of food thrown to them warranted adding "Please do not feed the monkeys" signs to the exhibit. In 2018, we conducted a similar study to determine if these signs affected the amount of food the monkeys received from humans.

Mark May

Major: Mathematics
Faculty Sponsor: Dr. Lynne Dieckman
3:45 pm | Harper 3028

"The Dimerization of CAF-1"

Proper genomic regulation is essential for the viability of all organisms. After DNA is replicated, it is bound into structures called nucleosomes, composed of 147 base pairs of DNA wrapped around an octameric core of histone proteins. Upon the completion of DNA replication, the protein chromatin assembly factor 1 (CAF-1) recruits the histones H3 and H4 as dimers to newly synthesized DNA, marking the first step of the nucleosome assembly process. Because the histone core of a nucleosome contains two H3-H4 dimers, it follows that the dimers may be recruited as a pair. This could necessitate CAF-1 operating as a dimer. To investigate whether CAF-1 operates as a dimer, and to determine the potential sites of this dimerization, gel filtration chromatography and dynamic light scattering (DLS) were used. These experiments showed potential evidence of dimerization.

Rachel Melchionna

Major: Biology
Faculty Sponsor: Dr. Mark Reedy
3:45 pm | Harper 3023

"Methods of Inducing Alveolar Bone Loss: A Comparative Analysis"

Periodontitis is the inflammatory destruction of tooth-supporting structures. Rat models are commonly used to study the disease, but the published protocols are wildly variable. This study compares common methodologies to determine the best experimental design. Adult male Sprague-Dawley Rats were randomly assigned to experimental and control groups and periodontitis was induced by ligature placement, with or without, lipopolysaccharide (LPS) injections and allowed to progress for 21 days. Alveolar bone loss was measured by gross dissection, Methylene Blue staining, and photography next to a 12mm ruler. Measurements were compared using One-way ANOVA followed by post-hoc Tukey tests. Significance was set at $p \leq 0.05$ with a 95% confidence interval. While no data reached notable significance, notable trends illustrate the necessity of LPS to the development of periodontitis and protocols must be stretched till at least 21 days.

Shilpa Nair

Major: Biology
Faculty Sponsor: Dr. Anna Selmecki
3:45 pm | Harper 3023

"Segmental aneuploidies Inverted Repeats Cause Azole Resistance in the Fungal Pathogen Candida albicans"

Candida albicans is a fungal organism that exists on the human skin, in mucus membranes and in the gut. When pathogenic C. albicans is treated with anti-fungal drugs, it can acquire mutations that make it drug-resistant. This can be dangerous for people with compromised immune systems such as patients undergoing chemotherapy or organ transplants or those who are suffering from HIV/AIDS. There is evidence that the increase of drug resistance for the pathogenic fungus Candida albicans correlates with the presence of an isochromosome of chromosome 5 (Selmecki et al 2006). My research focuses on the way that various exposures to azole affects the whole genome of C. albicans.

Dillon Nerland

Majors: Neuroscience, Biology
Faculty Sponsor: Dr. Ken Kramer
3:45 pm | Harper 3023

"Using Microphonic Assays to Analyze Otolith Attachment in Zebrafish"

The aim of this project is to investigate the effects and importance of the inner ear proteins in otolith attachment and function in zebrafish. Microphonic recording assays will be used to record action potential responses from the vestibular nerve in zebrafish. Zebrafish mutants for inner ear proteins have been generated via CRISPR/Cas9 genome editing and will be compared and contrasted with wild-type zebrafish. This investigation will help us to better understand the linking proteins in the inner ear in zebrafish, and will help us better understand the homologous structures that are present in human inner ears.

Cameron Nielson

Majors: Mathematics, Computer Science
Faculty Sponsor: Dr. Catie Baker
2:55 pm | Harper 3028

"Math Accessibility for the Visually Impaired (MAVI)"

Math Accessibility for the Visually Impaired, or MAVI, is an iOS mathematical learning application for those without access to Nemeth braille and other more expensive and obscure blind accessible platforms. MAVI parses math by order of operations, breaking up each part of the equation and then relaying it back to the user. It utilizes haptic input and spoken feedback to streamline the navigation process of equations for the ease of the learner.

Hana O'Hagan

Major: Chemistry
Faculty Sponsor: Dr. Erin Gross
3:45 pm | Harper 3028

"Metal Ion Concentration Analysis of Water from Lima, Perú"

Creighton University is already dedicated to improving water quality in places such as the Dominican Republic and Guatemala. However, current efforts have focused on biochemical contaminants in water. Research has shown that inorganic contaminants, such as metal ions, can also have significant health impacts. This research project investigates the concentration of metal ions in water used by people in Lima, Peru, in order to evaluate whether metal ions should be of concern when evaluating water quality in marginalized communities. On target-water chemistry analysis cards and atomic absorption spectroscopy were employed to test water for zinc, iron, cadmium, lead, and copper metal ions. The results of this project will be used to suggest follow up research, such as potential alterations to water filters currently produced by Creighton University or best practices for evaluating water quality in marginalized communities.

Braden Oldham

Major: Neuroscience
Faculty Sponsor: Dr. Anna Dunaevsky
2:55 pm | Harper 3028

"Probing Astrocyte Function in Fragile X Syndrome Human Stem Cell-derived Astrocytes"

Fragile X syndrome (FXS) is an X linked neurodevelopmental disorder related to intellectual disability and the most common monogenic cause of autism spectrum disorder. FXS results from an expansion of CGG repeat in the 5'-untranslated region of FMR1 gene, leading to the absence of fragile X mental retardation protein (FMRP), an mRNA binding protein. Recently, the absence of FMRP in astrocytes has been implicated in structural and functional synaptic deficits in FXS mouse models. However, the contribution of human astrocytes to such impairments remains unclear. To investigate whether astrocyte dysfunction contributes to the pathogenesis of FXS, we generated a human-based FXS model via differentiation of human induced pluripotent stem cells (hiPSC) to astrocytes. FXS astrocytes also have altered functional properties displaying enhanced ATP-induced calcium signaling. Our studies suggest a role of human astrocytes in FXS pathogenesis and provide therapeutic targets for the personalized FXS treatment.

Mitchel Pham

Major: Biology
Faculty Sponsor: Dr. Andrew Baruth
3:20 pm | Harper 3027

"Influence of Hand-Polished CAD/CAM Zirconia on Gingival Fibroblast Adhesion"

Due to its enamel-consistent coloring, biocompatibility and ease of computer-aided milling, zirconia has been considered as a potential dental restoration material to replace titanium used in dental implants and healing abutments. In this study, we examined the effects of zirconia surface topography following hand-polishing on soft tissue integration, specifically human gingival fibroblast adhesion and proliferation . The surfaces were characterized by optical profilometry, atomic force microscopy (AFM), and scanning electron microscopy.

From AFM, roughness (Ra), as well as the skewness and kurtosis of height profiles, quantified the surface. Fibroblast adhesion was quantified by a focal adhesion kinase enzyme-linked immunosorbent assay.

Allison Quady

Majors: Psychology
Faculty Sponsor: Dr. Matthew Huss
2:55 pm | Harper 3028

"Comparing the PAI and the M – FAST in their Ability to Assess Response Style"

Accurate and honest responding is often an issue when working with criminal offenders. Fortunately, there are assessment measures available to assess for response style in criminal populations. In this study, the researchers aim to compare participants' responses on both a single measure of malingering and a measure of overall pathology containing several validity scales while examining offender demographics, personal history, educational history, legal history, and other psychological testing.

Carly Rademacher

Majors: Journalism, English
Faculty Sponsor: Dr. Kate Sheehan
2:55 pm | Harper 3023

"Inclusionary Exclusion: The Economics of Inclusionary Zoning Policies"

One prominent local policy crafted to address lack of affordable housing is inclusionary zoning (IZ) which is described as programs that either require developers to make a certain percentage of the units within their market-rate residential developments available at prices or rents that are affordable to specified income groups, or offer incentives that encourage developers to do so. While IZ has been proven to produce a very limited amount of affordable housing, it is an insufficient solution to an issue of this scale. At best IZ provides a minimal solution, and at worst it does nothing to alleviate the pressure on supply. In light of the insufficiency of inclusionary zoning as a

purposeful solution to the affordable housing crisis, I will look at U.S. Department of Housing and Urban Development (HUD) programs, vouchers, and density as potential alternative points of effective policy.

Jacqueline Ramos

Major: Mathematics
Faculty Sponsor: Dr. Stephen Gross
2:05 pm | Harper 3023

"Rheological Study of Dental Materials Containing Microcapsule Fillers"

Polymer resin-based materials are used widely in dentistry. Polymer based dental materials offer the advantage of pleasing aesthetics, are mercury-free and allow for more of the tooth structure to remain intact. Despite these advantages, improvements in the materials are needed to improve their performance. In an effort to improve the performance of dental materials, new microcapsule-based fillers have been developed. Previous research in Dr. Gross' laboratory has shown the potential of using microcapsules for delivering remineralizing and antimicrobial agents 1-3. In my research, I will attempt to study the rheology of dental materials with these new fillers. The viscosity and flow rate of a dental material greatly impact the handling characteristics the dentist experiences for the material and even some of the mechanical properties including adhesion to the enamel.

Kathleen Resman

Major: Exercise Science
Faculty Sponsor: Dr. Jake Siedlik
2:55 pm | Harper 3028

"Do T-cells Need Friends? Does Diversity of Culture Matter?"

Recent research in exercise immunology has focused on exercise-induced changes in surface markers of activation in T cells and subsequent proliferative responses to in vitro stimuli. Cell isolation and analyses methods tend to differ by lab, leading to ambiguity in the literature regarding exactly how exercise alters immunocompetence. Of interest now is determining the most physiologically relevant parameters for in vitro models; specifically, should analyses be

conducted on homogenous cell subsets (e.g. CD3+) or is it best to analyze cell subpopulations within a mix of peripheral blood mononuclear cells (PBMC)? The purpose of this study is to quantify proliferation differences for CD3+ cells cultured and stimulated in either a homogenous mix (>98% CD3+ cells) or those cultured with PBMCs. The overall aim is to determine whether T-cell proliferative ability is altered based on culture conditions and use this as a foundation for reassessing our knowledge related to exercise-induced changes in immunocompetence.

Brendan Rezich

Major: Neuroscience
Faculty Sponsors: Dr. Gopal Jadhav
3:45 pm | Harper 3023

"Identification of Small Molecule Inhibitors of Detrimental TREM-1"

The receptor on myeloid cells TREM-1 has been identified as the receptor responsible for inflammation. Inflammation is a response from our innate immune system to some stimulus which can have negative effects. Inflammation is negatively associated with many chronic and acute cardiovascular conditions such as atherosclerosis, myocardial infarction, and sepsis. Due to its role in inflammation, TREM-1 is a valuable target for treatment of such conditions. A ZINC database of potential TREM-1 inhibitors was created using Ligprep and Epik modules of the Schrödinger. The PDB crystal structure of TREM-1 was overlaid with potential inhibitors to further select viability. Quinolone became a clear option for use as a molecular skeleton. Initial quinolone motifs induced TREM-1 inhibition with IC50 values of 7.0 μM and no cellular toxicity. The low IC50 value and lack of toxicity shows a high potential for the use of quinolone motifs as TREM-1 inhibitors.

Anna Rossini

Majors: Chemistry, Mathematics, Biology
Faculty Sponsor: Dr. Margaret Doig
3:45 pm | Harper 3023

"Randic and Weiner"

We present results in mathematical chemistry calculating and comparing the Wiener index, which is a topological index, and Randic index, which is a connectivity index for several families of skeletal graphs of organic molecules, including saturated hydrocarbons and related molecules. We studied mathematical chemistry and developed propositions, conjectures, and theorems. We present results on information from comparing the Wiener Index and Randic Index for families of molecules, specifically cycloalkanes and methylcycloalkanes.

Erika Ruhnke

Majors: Psychology, Theology
Faculty Sponsor: Dr. Alicia Klanecky
3:45 pm | Harper 3028

"Religiosity as a Moderator of Mental Health Difficulties and Life Satisfaction"

This study seeks to understand how students' religiosity is related to their mental health. Freshmen Ratio Studiorum Program (RSP) students (N=627) completed a survey incorporating a variety of assessments delivered via Qualtrics. Attendance of religious services was negatively correlated with adverse childhood experiences and alcohol consumption and positively correlated with resiliency, life satisfaction, and physical health. Religious attendance moderated the relationship between self-reported mental health difficulties and life satisfaction such that attendance reduced the negative impact of mental health difficulties on life satisfaction. Implications of religious attendance as a protective factor regarding mental health will be examined.

Jessica Sandcork

Major: Mathematics
Faculty Sponsor: Dr. Aimee Schwab-McCoy
3:45 pm | Harper 3027

"Data Reduction on High-Dimensional Data Sets Using Principal Component Analysis (PCA)"

Exceptionally large data sets are prevalent in many fields, though analyzing this data is challenging, as traditional testing procedures cannot accommodate it appropriately. Principal component analysis (PCA) can be used to reduce the number of variables, by finding linear combinations of variables that explain a large proportion of variability in the data set. By reducing dimensionality of the data, we hope to resume multiple testing procedures without the challenge of high correlation between variables. If successful, usage of data reduction with PCA could be applied to large data sets in multiple fields, making big data more useful and workable.

Sahil Sandhu

Majors: Biology, Classical Civilizations
Faculty Sponsor: Dr. Erin Walcek Averett
2:55 pm | Harper 3023

"Ancient Fertility Worship in the Mediterranean: An Investigation of a Stele of Bes from the Joslyn Art Museum"

After the Roman conquest of Egypt the worship of Bes, the Egyptian dwarf-god of fertility, spread throughout the Roman Empire and evolved into an important religious cult. My research focuses on an unpublished stele of Bes from the Joslyn Art Museum. This stele seems to have been a votive statue used for household worship. By comparing the Joslyn Bes stele with others throughout the Mediterranean, I have dated the piece by identifying stylistic characteristics common to the 2nd century BCE. Between its stylistic characteristics and the material used, the Joslyn Bes seems to be from Syria, far from Egypt where the cult first emerged.

Jaxson Schneider

Majors: English, History
Faculty Sponsor: Dr. Lydia Cooper
3:45 pm | Harper 3029

"Ignatian Spirituality in *Infinite Jest*: Discerning Through the Times' Darkness"

Attempting to bridge the Jesuit-sized gap in the study of spirituality in David Foster Wallace's fiction, this paper examines the myriad direct and thematic references to the Society of Jesus in *Infinite Jest*. To bring those connections to fruition, this paper uses Dean Brackley's *The Call to Discernment in Troubled Times: New Perspectives on the Transformative Wisdom of Ignatius of Loyola* as its principal guide to interpreting Ignatius' age old spiritual tradition. Responding to the prevalence of addiction, solipsism, and growing spiritual torpor in U.S. life, connections between *Infinite Jest* and Ignatian Spirituality ultimately provide an urgent prescription for a spirituality rooted in active discernment, surrender to something larger than oneself, and connection with society's "others" in order to heal and make meaning in the modern world.

Kaylee Schwasinger

Major: Neuroscience
Faculty Sponsor: Dr. Holly Stessman
3:45 pm | Harper 3028

"Linking Immune Dysfunction and Autism Spectrum Disorder through Mutations in KMT5B and SMC3"

Autism Spectrum Disorder (ASD) is a developmental disorder encompassing a "spectrum" of symptoms, skills, and levels of disability. Genotypic and phenotypic heterogeneity among patients has been an obstacle for identifying causal genes. Through whole exome sequencing, we have identified an individual (SSC 11519.p1) carrying two mutations in neurodevelopmental risk genes, KMT5B and SMC3, presenting with neurodevelopmental and immune dysfunctions (Stessman et al., 2017). The biological mechanisms of these mutations to the individual's phenotype is currently unknown. The central hypothesis of my research is that mutations in KMT5B and SMC3 are

loss-of-function and are synergistically responsible for defects in proliferation, cell cycle progression, and DNA damage repair.

Robyn Scott

Major: Chemistry
Faculty Sponsor: Dr. Lynne Dieckman
2:05 pm | Harper 3028

"Mapping the Binding Sites for CAF-1 on PCNA"

Gene silencing is controlled in large part by the specific and precise packaging of DNA in the nucleus. This process is principally orchestrated by two proteins: proliferating cell nuclear antigen (PCNA) and chromatin assembly factor 1 (CAF-1). How these proteins interact and function together is not well understood. Preliminary data suggests that CAF-1 may interact with PCNA at a secondary site in addition to a canonical binding site. To study this interaction, I am developing and performing protein-protein binding assays using single amino acid PCNA mutants and wild type CAF-1. These assays include enzyme-linked immunosorbent assays and fluorescence anisotropy.

Matthew Seikel

Major: Emergency Medical Services
Faculty Sponsor: Dr. Michael Miller
3:45 pm | Harper 3028

"The Characterization of Fullerols Using MALDI Spectrometry"

C60 (Buckministerfullerene), a crystalline allotrope of pure carbon, is a spherical molecule with extremely high, icosahedral (I_h) symmetry. The primary objective of our project was to synthesize fullerols, polyhydroxylated C60, and use these compounds as a nano-scaffold for the construction of novel spherical mesoparticles with highly ordered size distributions. We began by preparing brominated fullerenes and investigated their use as possible intermediates for the synthesis of fullerols using a mechanogrind process with hydrogen peroxide. Products were characterized with matrix-assisted laser desorption ionization (MALDI) mass spectrometry; and UV, IR, and NMR spectroscopies. We also analyzed the short-term shelf-life of our compounds produced over a period of approximately 11 months.

Srishti Singal

Major: Pharmacy
Faculty Sponsor: Dr. Jeffrey North
3:45 pm | Harper 3028

"Improved Aqueous Solubility of Novel Antimycobacterial Indole-2-carboxamides through Complex Formation with Cyclodextrins"

Tuberculosis (TB) is listed as the top killer infectious disease worldwide. TB is primarily a pulmonary infection caused by the bacterium Mycobacterium tuberculosis. Due to the increased prevalence of drug-resistant strains and a lengthy and complicated multi-drug therapy, additional drug discovery and development is warranted. Indole-2-carboxamides (IC) are a promising class of novel and potent antimycobacterial agents despite being poorly absorbed in vivo. ICs complexed with cyclodextrins showed improved aqueous solubility, which could lead to improved IC absorption. This study disseminates the characterization of these complexes where we determined IC-cyclodextrin complex binding interactions, improved aqueous solubility and IC-release kinetics.

Gillian Straub

Major: International Relations
Faculty Sponsor: Dr. Erika Moreno
2:55 pm | Harper 3023

"Explaining Global Variance in Freedom of the Press"

Freedom of the press is frequently studied as an explanatory factor for variance in democracy; however, it has rarely been studied as a dependent variable. This study asks: what explains the variance in levels of freedom of the press in countries? Rooted in theory, the study examines causal factors including income, literacy, regime type, and presence of war and explores the idea that regional trends may affect a country's freedom of the press, using 122 countries in 2016. Both in-state and regional factors were statistically significant and contribute to the literature by outlining paths to move forward with other studies of freedom of the press.

George Varghese

Major: Biology
Faculty Sponsor: Dr. Devendra Agrawal
2:55 pm | Harper 3028

"Frequency of Post-procedural Echocardiograms in Catheter-mediated Patent Ductus Arteriosus Closure is Greater Than After Surgical Closure"

This study set out to retroactively examine post-operative surveillance practices, in the form of echocardiogram, after closure of patent ductus arteriosus (PDA.) To accomplish this, we performed a cohort study of 364 patients who had closures by either of two methods. The first group contained 147 patients whose ductuses were closed through surgical intervention, while the second group was 217 patients whose closure was catheter mediated. Through non-parametric tests we observed that though the ductuses tend to be smaller and the patients larger, there is more frequent Echo surveillance after catheter treatment of PDA than after surgical intervention.

Nicolas Villarraga

Major: Psychology
Faculty Sponsor: Dr. Amy Worthington
2:05 pm | Harper 3023

"Combined Influence of Subsytolic Circulatory Occlusion and Pedal Frequency on Cardiovascular Responses During Exercise in Younger and Older Adults"

Peripheral nervous system feedback arising from mechanically and metabolically sensitive afferents (Group III/IV, respectively) are central components of the exercise pressor reflex. Experimentally, locomotor venous distention can be simulated via subsytolic regional circulatory occlusion (SubRCO) thereby augmenting the exercise pressor reflex. Furthermore, high pedal frequency increases type II muscle fiber recruitment during exercise likely increasing non-oxidative metabolism. To date, studies investigating the influence of aging on the exercise pressor reflex have presented conflicting data with most utilizing small muscle mass exercise (e.g. handgrip). Therefore, the purpose of this study was to determine the influence of SubRCO, pedal frequency, and the combination thereof on blood pressure (BP) during exercise in older and younger adults. We

hypothesized that during exercise 1) independent of pedal frequencies and age, SubRCO will augment BP and 2) older adults will have greater increases in BP at high pedal frequencies with and without SubRCO compared younger adults.

Andrew Walther

Majors: Mathematics, Biomedical Physics
Faculty Sponsor: Dr. Michael Nichols
3:45 pm | Harper 3028

"Correlation Between a Deep-learning-based Model Observer and Human Observer for a Realistic Lung Nodule Localization Task in Chest CT"

Task-based image quality assessment is essential for radiation dose optimization in CT protocols. Human observer studies are considered reference standard to evaluate image quality. However, it is time consuming and the evaluation results usually suffer from a large amount of inter- and intra-observer variations. A mathematical model observer is promising to perform task-based image quality assessment in an objective and quantitative way and many models, such as Channelized Hotelling observer, have been demonstrated to be highly correlated with human observer performance. However, it remains challenging to apply these models in realistic detection and localization tasks involving anatomical structures. The development of a deep-learning-based model observer and its correlation with human observer performance in a realistic lung-nodule localization task is a necessary result. This study exhibited the potential to use a deep-learning-based model observer to directly assess the diagnostic quality of patient CT images in the future for clinically-relevant detection tasks.

Tyler Wikoff

Major: Neuroscience
Faculty Sponsor: Dr. Anna Selmecki
2:55 pm | Harper 3027

"Identification and Characterization of Long Repeat Sequences - Drivers of Genome Plasticity within the Candida albicans Genome"

Candida albicans, the most prevalent opportunistic fungal pathogen amongst humans, relies on chromosomal and sub-chromosomal

mutational changes to acquire drug resistance and confer pathogenicity. Genome rearrangements resulting in copy number variation (CNV) and loss of heterozygosity (LOH) frequently occur during the rapid adaptation of these fungi to novel environments and stressors, but the mechanisms of formation are not understood. Here, we investigate the involvement of long, previously undescribed repetitive sequences in the C. albicans genome as significant sources of genome plasticity, namely their association with CNV and allele ratio breakpoints. We expand the list of previously studied repetitive sequences such as MRS, tRNA, and LTR regions to include coding and intergenic regions previously unknown to contain repetitive sequences. Using a combination of next-generation sequencing, whole genome alignments, and genome visualization, ubiquitous repetitive sequences were compiled, validated, characterized, and grouped to create a robust list of sequences which provides useful information.

Mary Kate Wolken

Majors: History, Spanish
Faculty Sponsor: Dr. Jose McClanahan
2:05 pm | Harper 3027

"Public Spaces, Public Health, and the Public Good: Spanish Medical Culture and the Junta de Damas de Honor y Mérito"

A small group of upper-class women founded the Junta de Damas de Honor y Mérito in Madrid in 1787, with the mission to empower women through education. As this group evolved in parallel alongside the nation of Spain, this very definition of education changed, allowing the organization to remain devoted to their foundational cause. The group's work from 1860-1920 demonstrated their commitment to public health and allowed them to establish a more permanent, public presence. Critical to this analysis is the study of Spanish medical culture during this time; medical language served as the most potent force in determining gender-based social roles and expectations, and scientific advancements dominated public attitudes towards women. The Junta de Damas at times worked in conjunction with and also against broader sentiments and policies based on religio-social norms, weathering social and medical changes in Spain as the eugenics movement and modernity loomed in the early 20th century.

About the Honors Program

Honors Program Mission Statement

Rooted in the 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.

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 students the opportunity to pursue a course of study that complements their majors. 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.

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Program by Gillian Straub and Erin Walcek Averett