Creighton
UNIVERSITY

College of Arts
and Sciences

5th ANNUAL HONORS DAY

HONORS PROGRAM
RESEARCH PRESENTATIONS

Wednesday, April 22, 2009
2:00-5:00 P.M.
Harper Center

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A Word from Dean Lueger

Welcome to Honors Day, 2009. Today we recognize certain achievements of Arts and Sciences students, and in doing so, honor them for the innovation, creativity, and dedication that they have demonstrated in their academic work. I have no doubt that as you stop in to listen to a presentation, to study a poster, or to ponder a piece of artwork, you will be amazed by what undergraduates can produce when provided the proper combination of freedom of inquiry, disciplined focus, and mentorship from faculty. 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. To the students, I say, we are proud of your contributions to Creighton and to your fields. We honor you.

Congratulations, Class of 2009!

Robert J. Lueger, Ph.D.
Dean, College of Arts & Sciences

A Word from the Director

Dear Graduating Seniors,

I remember the first day you set foot on campus, filled with expectations, motivation, and passion. I remember your enthusiasm as you discovered the possibilities that were available to you. I remember your first days on the honors floor, paving the way to the new honors program. As I look back on the past four years, I can't help but admire how far you have come. Today's presentations are just the tip of the iceberg: you have dedicated several years to educating yourself in the liberal arts; you have shared your many talents with the community; you have spent countless months perfecting your research skills. The fruits of that hard work are readily apparent. We are very proud of all your achievement and look forward to hearing about your upcoming accomplishments.

Congratulations, Class of 2009!

Dr. Isabelle D. Cherney
Michael W. Barry Professor
Director of the Honors Program

Honors Program Directors

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Department of Physics

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Department of Chemistry

Dr. Eileen Wirth
Department of Journalism and Mass Communication

Dr. Greg Zacharias
Department of English

Executive Board Student Members:
Ms. Hannah Novoa
Mr. Adam Karnik

Student Board Members

Executive Committee:

Sarah Fredrick- President
Adam Karnik- Vice Pres
Eric Ruchensky- Secretary
Hannah Novoa and Ana Heck- Social Chairs

Seniors:

Katy Anderson
Becky Bullard
Sarah Fredrick
Eric Ruchensky
Nadia Sebastian

Juniors:

Brian Carroll
Ben Johnson
Adam karnik
Jane Matthew

Sophomores:

Ana Heck
Sumit Kar
Hannah Novoa
Mark Ridder

Freshmen:

Ali Guinan
Danielle Wiesler
Joel Mapes
Tim Foster

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 a love of learning.

The Honors 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 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 a piece of graded writing and an essay.

Curriculum Overview

The curriculum involves the following key elements:

Foundational Sequence: Honors students take three courses (9 credits) in their first three semesters that introduce them to the Christian, Catholic, and Jesuit intellectual traditions that lie at the heart of a Creighton education within the context of Western civilization and of the pluralistic world we inhabit.

Sources and Methods Courses: Honors students take five courses (15-20 credits) that induce them to think critically about information, assumptions, and arguments found in multiple forms of academic and cultural discourse. Several such courses are offered each semester in a range of academic disciplines.

Honors Senior Perspectives Course: Honors students are required to take a Senior Perspectives (SRP) course, and may select any such course offered in the College. Each year, however, one SRP will be designed for, and offered exclusively to, Honors students.

Senior Independent Research Project: Honors students are required to demonstrate their capacity for advanced, self-directed, individual work by completing an approved project within their major(s). They will undertake these projects under the guidance of assigned faculty mentors and present their findings at Honors Day.

Mentoring and Learning Plan: All of the above elements are incorporated into a Learning Plan, developed individually by Honors students in close consultation with a faculty mentor. The mentoring process will shape Honors students into confident, independent learners who take active roles in their own education, and expect the most of themselves. Through their individualized Learning Plans, Honors students integrate their backgrounds and interests with the strengths and Mission of the University and the College. Their Learning Plans are reviewed and approved by their faculty mentors and by the Program Director. While Honors students are expected, therefore, to excel in all areas that characterize a Creighton undergraduate education, their fulfillment of these goals will be determined on an individual basis rather than by the more structured curricular requirements that apply to other students.

For more information, please consult the Honors Program webpage:
http://puffin.creighton.edu/ccas/honorprogram

Poster Presentation Schedule

2:00-3:00	Jamie Fosdick
	Eric Jamison
	Beth Mittelstet
	Karen Poyer
	Elizabeth Schwarzkopf
	Kristin Schwarzkopf
	Tiffany Tsai
	Christopher Vacek

3:00-4:00	Matthew Bassett
	Deidre Gordon
	Andrew Hanson
	John Kelsey
	Megan Ruhland

3:20-3:40.....Room 3023-B

Welcome, Reception, & Awards Presentation

4:00-5:00	Jonathan Cowin
	Jessica Gaulter
	Elsbeth Klotz
	Eric Ruchensky
	Nadia Sebastian
	Allison Showalter
	Patricia Watson
	Anastasia Yanchillina

All poster presentations will be located in room 3023 and hallways near 3rd floor rooms.

Oral Presentation Schedule

TIME	ROOM	PREESENTERS
2:15-2:30	3028-BC	Katy Anderson
	3027	Natalie German
	3028-A	Kathleen McKillip
	3029	Bethany Smith
2:30-2:45	3029-A	Meghan Freeman
2:45-3:00	3028-A	Rajeev Anchan
	3027	Rebecca Bullard
	3029	Sarah Norris
3:00-3:15	3029-A	Josh Hebbert
	3028-BC	Sam Padilla
	3027-A	Amanda Ross
	3026	Kara Stockdale

3:20-3:40.....Room 3023-B

Welcome, Reception, & Awards Presentation

3:45-4:00	3027-A	Joshua Hall
	3029-A	Marcy Kramer
	3026	Sam Pierre
4:00-4:15	3028-A	Daniel Andersen
	3029	Marnita Coenraad
	3028-BC	Geoff Hays
	3027	Anne James
4:15-4:30	3027-A	Sarah Fredrick
	3029-A	Brandon Vaca
4:30-4:45	3029	Jamie Prevedel
	3027	Elizabeth Songy
4:45-5:00	3029-A	Ryan Borchers
	3027-A	Kristin Wakin

Research Abstracts

Rajeev Anchan
Major: Biochemistry and Mathematics
Faculty Sponsor: Dr. HollyAnn Harris and Dr. Daniel R. Anderson, University of Nebraska Medical Center
Research Title: ***The Significance of Scavenger Receptors in Vascular Inflammation: Their Role in Innate Immune System Activation and Microbubble Adherence***

The complexities of vascular inflammation are multifaceted, yet while clinical treatment regimens are effective, there is a need to tailor treatments to patient needs.

Recent data implicate the role of Toll-like receptors in the progression of atherosclerotic disease. Complement activation and C-reactive protein are also central in the development and maintenance of vascular inflammation and thus have become key points of interest.

Our published data demonstrate that PESDA microbubbles are dependent upon complement for binding to injured vessels. The application of PESDA in endothelial imaging is expected to allow risk stratification of vascular injury and targeted therapy to minimize cardiovascular dysfunction.

Daniel Andersen
Major: English
Faculty Sponsor: Dr. Mary Helen Stefaniak
Research Title: ***Death and Dr. Hurley: Fact and Fiction in the Making of a Chicago Surgeon***

This piece of creative nonfiction examines the legend of the kidnapping of the author's uncle, the renowned Chicago surgeon Dr. William Hurley. In it, the author investigates the complexities of his relationship with the doctor and inspects how this man relates to the author's own identity. Through the selection of scenes, voices, characters, and images, the author tests original and inherited notions of family, history, medicine,

and the 1920's gangster. In this essay, the author reflects his quest to see how fact and fiction can work together to form the truth behind the legend of Dr. Hurley.

Katy Anderson
Major: English, Spanish, and Economics
Faculty Sponsor: Dr. Bridget Keegan
Research Title: ***Unearthing the Self in Willa Cather's*** *O Pioneers!*

Alexandra, the heroine of Willa Cather's 1913 novel *O Pioneers!*, is an example of someone with a conscious connection to her environment. She defies typical gender roles established by patriarchal ideals and in doing so finds herself in a complex and spiritual relationship with her environment. Alexandra respects the land for its inherent beauty and productivity and does not try to manipulate it or exploit its resources for her own personal advantage. Instead, Alexandra demonstrates ecofeminist ideals in which she cares for and cooperates with the land to preserve its resources. Alexandra understands herself as an active participant in her environment rather than a bystander, and that is where her identity is discovered.

Matt Bassett
Major: Physics
Faculty Sponsor: Dr. Mike Nichols
Research Title: ***Non Linear Optics: Determination of the Two-Photon Cross Section of Lipophilic Biological Tracers***

Two-photon excitation was predicted in the early 20th century by Maria Göppert-Mayer in her doctoral dissertation on quantum mechanics. It was not until almost 60 years later, in 1990, Denk, Piston and Webb were able to develop a consistent technique to produce fluorescent images using scanning laser microscopy. Two-photon excitation has many advantages of its more common single photon modality such as: the ability

to excite normally UV absorbing molecules with better penetrating IR light; higher spatial localization controlled solely by the objective; and reduced photo bleaching both above and below the focal plane. Because of the advantages, it is useful to characterize the two-photon properties of current biological tracers with respect to their two-photon cross-section to allow efficient protocols for imaging tracers with both single and multiple photon modalities. In this lecture I will be presenting the methods I used to calculate the two-photon cross section as a function of excitation wavelength of select MTTI NuroVue tracers. Further there will be a discussion on our findings with respect to expectations versus results.

Ryan Borchers
Major: Journalism
Faculty Sponsor: Dr. Carol Zuegner
Research Title: ***The Immutable Evolution of Baseball Writing***

Baseball writing has a fabulous tradition in the history of American journalism, but like many forms of media, it has undergone significant changes in the digital age. This presentation will focus on the exciting changes that have affected baseball coverage, while remaining true to the tradition that has made it great in this country.

Rebecca Bullard
Major: Psychology and Biology
Faculty Sponsor: Dr. Isabelle Cherney
Research Title: ***The Relationship between Early Childhood Activities and Spatial Perception***

Tests of visuospatial ability have been used to predict success in engineering courses and are part of standardized admissions tests. Thus, it is important to understand factors that influence these abilities because they have implications for real-life career opportunities and for potential earnings.

Prior research suggests that sports, computer games, and some early childhood activities may influence visuospatial skills. The purpose of the study was to initiate the first step in the validation of a new questionnaire that will allow classification of participants in terms of the type of activities that they practiced as children as a function of the spatial content and gender-typing underlying these activities.

Marnita Coenraad
Major: Philosophy
Faculty Sponsor: Dr. Jeffery Hause
Research Title: ***Rationality, Humanity, and the Ethical Treatment of the Developmentally Disabled***

Some modern and contemporary philosophers believe that our value, and consequently the way we should be treated, derives from our rationality. However, this claim is particularly problematic if we consider individuals with severe developmental disabilities. If such individuals have severely limited rational resources, then it would be acceptable to treat them as subhuman. In order to explain the imperative to treat all humans with respect and dignity, a new ground of value must be established. The aim of this paper is to explore what it means to be human and to investigate whether humanity is an appropriate ground for this moral imperative.

Jonathan Cowin
Major: Economics and Finance
Faculty Sponsor: Dr. Anne York
Research Title: ***Taking Your Ideas to Market***

Exceptional ideas are the driving force behind society, yet the unforeseen mechanism that brings such ideas to fruition is often overlooked. This presentation will focus on the ways in which one will market his or her ideas and look at a few examples I have assisted with in the past.

Research Abstracts

Jamie Fosdick
Major: Biology and Spanish
Faculty Sponsor: Dr. Dustin Stairs
Research Title: ***The Role of Environmental Enrichment in the Differential Locomotor Response to Caffeine in Rats***

Caffeine is one of the most widely used drugs in our society. Using a rodent environmental enrichment paradigm, I investigated how exposure to differential environments can alter sensitivity to caffeine. Rats were raised in one of three conditions of varying levels of novelty. Following exposure to these conditions, animals were given acute injections of various doses of caffeine (0, 10, 20, 30, and 40mg/kg; i.p.). Rats were placed in the locomotor chambers for 30 minutes, and then removed from the locomotor chamber, injected with a dose of caffeine, then placed back in the locomotor chambers for an additional 30 minutes. In all environmental conditions, there were dose-dependent changes in locomotor behavior, with the 30 mg/kg dose of caffeine resulting in the greatest increase in locomotion. There were also differences in the caffeine dose-response curves across the three environmental conditions. The results of this study indicate that exposure to different environments during development may alter the sensitivity to the stimulant effects of caffeine.

Sarah Fredrick
Major: Chemistry
Faculty Sponsor: Dr. Erin Gross
Research Title: ***Development of Microfluidic Devices for Electrochemiluminescent Detection of Antibiotics***

The goal of this project is to couple microchip capillary electrophoresis (CE) with electrogenerated chemiluminescence (ECL) for the separation and detection of quinolone antibiotics. ECL is a method in which an electron transfer reaction leads to the emission of light. This detectable light is proportional to the concentration of antibiotic in solution. The first step of

the project was the optimization of a micromolded carbon ink working electrode. The electrodes were incorporated into a flow system, which consisted of a micrometer-sized channel and various reaction parameters were studied. The optimized system has the potential to be miniaturized onto a microchip for portability and minimal waste production.

Meghan Freeman
Major: Classical Languages
Faculty Sponsor: Dr. Gregory Bucher
Research Title: ***Identification of the Joslyn Roman Marble Portrait Head***

The aim of my research was to provide a justified identification of a Roman marble portrait head at the Joslyn Museum in light of a history of difficulty in doing so. Uncertainty stemmed from the fact that, while the piece displays the main identifying feature of portraits of the emperor Augustus, namely a specific arrangement of locks of hair across the forehead, certain physiognomic features only hint at Augustus. I demonstrate that these inconsistencies are due to the fact that the portrait was recut from an original portrait of the unpopular emperor Nero.

Jessica Gaulter
Major: Biology and Spanish
Faculty Sponsor: Dr. Laura Hansen
Research Title: ***Role of EGFR in Hair Cycling and Inflammation in the Skin***

Mutations that increase EGFR (epidermal growth factor receptor) activity contribute to cancer. EGFR inhibitors are in clinical trials for the treatment of cancer; however, cancer patients treated with EGFR inhibitors and mice with decreased EGFR activity develop folliculitus, an acne type rash. We used skin-targeted Egfr mutant mice to investigate mechanisms through which reduced EGFR activity leads to perifollicular

inflammation. In these mice, mast cell infiltration occurred subsequently to defective hair follicle involution. Neutrophils were also associated with aberrant hair follicles in Egfr mutant mice. These data suggest that hair follicle defects resulting from abrogation of EGFR cause folliculitis.

Natalie German
Major: Chemistry- Biochemistry Track
Faculty Sponsor: Dr. Julie Soukup
Research Title: ***Structural Characterization and Analysis of Pre-Queuosine Riboswitch***

Riboswitches are segments of bacterial mRNA that bind specific ligands, undergo conformational change, and as a result regulate gene expression. In this way, riboswitches act as genetic switches that modulate RNA processing. The pre-queuosine riboswitch regulates the production of the small molecule pre-queuosine, which is an intermediate in the pathway that produces queuosine-tRNA. Queuosine within tRNA increases the diversity of recognizable mRNA target codons. We aim to elucidate the structure of the pre-queuosine riboswitch to aid the design of antibiotics that target the riboswitch and inhibit essential bacterial pathways. We have produced the riboswitch and have begun optimizing conditions for riboswitch crystallization. We will later use X-ray crystallography to obtain atomic-level details of how pre-queuosine interacts with the riboswitch.

Deirdre Gordon
Major: Biology and Philosophy
Faculty Sponsor: Dr. Robert Lewis, University of Nebraska Medical Center
Research Title: ***shRNA-mediated Knockdown of hKSR1 Decreases Colony Formation in Soft Agar and in Vivo Tumorigenicity***

Kinase Suppressor of Ras 1 (KSR1) functions as a molecular scaffold to promote and regulate signaling through the Raf/MEK/ERK kinase cascade. KSR1 interacts with Raf, MEK, and ERK and is capable of enhancing and sustaining ERK activation. We hypothesized that the depletion of human KSR1 (hKSR1) might decrease signaling events downstream of potent oncogenes lessening their tumorigenicity. We found that in vitro shRNA-mediated knockdown of hKSR1 greatly diminishes colony formation in both the B-Raf V599E dependent A375 human melanoma cell line and the K-Ras G13D dependent HCT116 human colon tumor cell line. Furthermore, in vivo shRNA-mediated knockdown of KSR1 decreases tumor growth in a HCT116 subcutaneous xenograft model.

Joshua Hall
Major: Philosophy
Faculty Sponsor: Dr. Elizabeth Cooke
Research Title: ***The View From Here: Pragmatism, Relativism, and the "Problem" of Truth***

This project is an analysis and attempted synthesis of the philosophical positions of Richard Rorty and Joseph Margolis (representing pragmatist and relativist positions, respectively), as regards the possible use of a notion of truth, or idealized rational acceptability, in actual practice. I conclude that when this pragmatic test is applied, the two positions become virtually identical in effect, thus avoiding the apparent disagreement entirely. Finally, a novel account of truth is proposed, which accounts for and combines the respective strengths of both approaches.

Andrew Hanson
Major: Communication Studies and Psychology
Faculty Sponsor: Dr. Erika Kirb
Research Title: ***Leadership Development in the Greek System at Creighton University***

Research Abstracts

Part of Creighton University's mission is to embrace the "intellectual, social, spiritual, physical and recreational aspects of students' lives." To fulfill that part of the mission, Creighton has numerous extra-curricular clubs and activities. A popular and longstanding extra-curricular option has been fraternities and sororities. Greek life provides numerous opportunities to students, including leadership development. Through various quantitative and qualitative methods (i.e. interviews, surveys, and focus groups) this research assesses the leadership potential and growth that involved students have experienced during their undergraduate enrollment at Creighton.

Geoffrey Hays
Major: Chemistry
Faculty Sponsor: David Dobberpuhl
Research Title: ***Identification of Food Oils Using Chemometric Analysis of Attenuated Total Reflectance FTIR Spectra***

Commercially available food oils, while chemically similar, are valued differently depending on taste, aroma, and other characteristics. To create a method that would allow an analyst to determine the identity of these oils without the sample preparation and length of testing typical of most chromatographic methods, FTIR spectroscopy was utilized with ATR techniques. Ultimately, a laboratory experiment to be used by students taking a senior-level course in instrumental analysis was designed. Once each oil was analyzed, four regions of significant difference between the spectra were selected from within the fingerprint region (>1400 cm-1). The average transmittance across each region (labeled A-D) was taken. Those averages were divided into each other (A/C and B/D) to compensate for minor changes in baseline absorbance readings and plotted graphically. Identification of an unknown is made through plotting divided peak averages on a graph with six standard oils and determining into which area of the graph they fall, as determined by the standard oils run in conjunction with the unknowns.

Research Abstracts

Josh Hebbert
Major: Studio Art-Ceramics
Faculty Sponsor: Dr. Amy Nelson
Research Title: ***Concepts of Nature***

Dichotomous relationships that are present in the world and our minds fascinate me. The ways in which contemporary culture interprets these relationships in connection to propagation and development is fundamental to my work. My lecture will be based on my exploration of these concepts through my Ceramic work. There will be a brief Q & A session.

Anne James
Major: Biology
Faculty Sponsor: Dr. Lisa Boucher, University of Nebraska, Omaha
Research Title: ***Where in the World is Hernandiaceae?***

A geographic database of ancient floras in Madagascar, Africa, India, Australia, and Southeast Asia was constructed and analyzed. The focus was the plant family Hernandiaceae and the origin and genera relationships within this family. Parsimony analyses of endemicity were used to help determine the connections between locations of the different species of Hernandiaceae. The breaking down of Gondwanaland was taken into consideration, in addition to how rifting may have affected where each species is located and how each species evolved.

Eric Jamison
Major: Finance
Faculty Sponsor: Dr. James Knudsen
Research Title: ***The Nebraska Broadband Initiative: A Study of the Economic, Financial, and Social Benefits of Affordable Rural Broadband Access in Nebraska***

This project seeks to discover the benefits of creating affordable

high-speed broadband internet access across rural areas of Nebraska. Currently broadband service providers cannot provide access to these small, isolated towns due to the high equipment investment costs and a limited consumer base, thus an insufficient opportunity for profits. The report explores options of federal funding for Nebraska as well as the effects on rural areas if such funding was provided.

John Kelsey
Major: Chemistry
Faculty Sponsor: Dr. Charles Austerberry
Research Title: ***Variation of Collagen Fibrils by Electron Microscopy in Patients with Connective Tissue Disorders***
Hereditary connective tissue disorders (CTDs) are a clinically and genetically heterogeneous group. CTDs are suspected clinically based on findings of variable combinations and degrees of skin hyperelasticity, joint laxity, tissue fragility and vascular involvement. Despite recent advances in the field of CTDs, for many affected individuals, diagnostic testing is still not informative. Ultrastructural studies of collagen fibrils from skin biopsies of patients with CTDs may show heterogeneity in collagen fibril diameter and size distribution. The aim of this study is to formalize criteria for fibril size distribution and its correlation with clinical findings in individuals with suspected CTDs.

Elsbeth Klotz
Major: Chemistry
Faculty Sponsor: Dr. Bruce Mattson
Research Title: ***Hydrogen and palladium foil. Two Classroom Demonstrations.***

In these two classroom demonstrations, students observe the reaction between H2 gas and Pd foil. In the first demonstration, hydrogen and palladium combine within one minute at 1 atm and room temperature to yield the non-stoichiometric,

interstitial hydride with formula close to the maximum known value, PdH0.7. In the process, palladium undergoes a noticeable color change and increase in brittleness. In the second classroom demonstration, the kinetics of H2 uptake is determined and yields a zero-order rate law. Other observations are provided in order to guide students to conclude that the experimental conditions for the demonstration result in kinetics governed by H2 mass transport. Both classroom demonstrations use the same simple apparatus, but otherwise are mutually independent.

Marcy Kramer
Major: French
Faculty Sponsor: Dr. David Vanderboegh
Research Title: ***The History of Algeria: What We Can Learn in Iraq***

The African country of Algeria was under French colonial rule for over 100 years. Its people were treated as subjects, its culture suppressed, its language considered foreign, and its religion outlawed. By examining the history of the War of Independence (1954-1962) and the many domestic conflicts that ensued afterwards in Algeria we can learn many lessons that can be applied to the United States' current situation in Iraq.

Kathleen McKillip
Major: Psychology
Faculty Sponsor: Dr. Isabelle Cherney
Research Title: ***Thinking Outside the Toy Box: Cognitive Dissonance, Creativity, and Gendered Play***

In a world of high-tech toys, how children play is changing. Play, especially "free" or unscripted play, allows children to process, organize, and respond to their world. Creative play, although widely valued and seemingly easy to "recognize", is an area where remarkably little psychological research has occurred.

My study involved presenting four-year-olds with gender-stereotyped household vignettes and asking them to "act out" the story with wooden blocks, looking for relationships between children's gender stereotypes, play complexity and creativity. Results indicate that play is a telling indicator of the schemas children develop to explain the world around them and their place in it.

Beth Mittelstet
Major: Biology
Faculty Sponsor: Dr. Dustin Stairs
Research Title: ***Environmental Enrichment and the Subjective Effects of Caffeine in Rats***

The purpose of the present study was to determine if environmental enrichment during development alters the discriminative stimulus effects of caffeine using an operant drug discrimination procedure. Male Sprague-Dawley rats were raised in either an enriched condition (EC) or an isolated condition (IC). EC and IC rats were trained on a two lever operant procedure to discriminate 30 mg/kg caffeine from saline. Following acquisition of the caffeine discrimination (80% appropriate responding), a caffeine generalization curve was determined. Results from the study indicate that environmental enrichment does not alter the sensitivity to the discriminative stimulus effects of caffeine.

Sarah Norris
Major: Psychology
Faculty Sponsor: Dr. Matthew Huss
Research Title: ***A Pattern of Violence: Analyzing the Relationship between Domestic Abuse and Stalking***

As the literature on stalking has grown, several studies have proposed a relationship between stalking and domestic violence. The current study examines a clinical sample of

domestic batterers to assess the stalking behaviors committed against the participants' intimate partners. The study examined the levels of severity between stalking and domestic violence, as well as identified differences between batterers who exhibited stalking related behaviors and those who did not. A significant relationship between stalking behavior and domestic violence was found, with severe stalking related to higher levels of domestic violence and more extreme psychopathology.

Samuel Padilla
Major: English
Faculty Sponsor: Dr. Bridget Keegan
Research Title: ***Separation Anxiety: Exile in Paradise Lost and Ovid's Last Poems***

Themes of exile and redemption are integrally connected in the latter works of Ovid and Milton. Ovid's exile unfolds over the combined nine books of Tristia and Epistulae ex Ponto, chronicling the psychology of a relegatus as he addresses his loved ones a final time and prepares to be separated from everything familiar, begging forgiveness from Augustus, and ultimately resigning himself to spend his days at the edge of the civilized world. Milton similarly depicts Satan in Paradise Lost, though pride causes this exile to trade redemption for revenge, and leads to catastrophe.

Samuel Pierre
Major: Psychology and Spanish
Faculty Sponsor: Dr. Isabelle Cherney
Research Title: ***Separating the Sexes: A Comparison of Science Career Choices in Single Sex and Coed High Schools***

This study analyzed and compared stereotype threat susceptibility and career choice among high school students of different backgrounds. Adaptations were made to Dr. Isabelle Cherney's Mathematics and Science Career Choices survey

to accommodate the inclusion of a stereotype threat and a short math test. The resulting survey was administered in both rural and urban high schools of the United States as well as in Switzerland. The presentation will cover the significant differences between students from single sex and coed high schools in their math abilities, perceptions of the sciences and personal career aspirations.

Karen Poyer
Major: Mathematics
Faculty Sponsor: Dr. Mark Wierman
Research Title: ***Measuring the Health of the Global Information Grid***

The Global Information Grid (GIG) is the globally interconnected end-to-end set of information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating, and managing information on demand to war fighters, defense policy makers, and support personnel. The GIG's everyday health must be measured and monitored to ensure that each person who needs to can access the information that it holds in a timely manner. This project provides a recommendation of a system of metrics that measures the survivability, reliability, and sustainability of the GIG on a daily basis.

Jamie Prevedel
Major: Biology
Faculty Sponsor: Dr. Mark Reedy
Research Title: ***Functional Knock-down of c-kit in the Wing Bud Apical Ectodermal Ridge***

The c-kit protein is expressed in early chicken embryos, specifically in the limb buds and somites. Its function, if any, is unknown. The knockdown (reduction but not total elimination) of c-kit will help us to determine the function of c-kit in avian

limb development. However, delivering the knock-down construct to the limb bud requires developing new protocols. Specifically, I have been testing whether or not pluronic gels are toxic to early chick embryos or interfere with normal limb development, and if electroporation can efficiently transfer knock-down construct DNA out of pluronic gels and into limb ectoderm.

Amanda Ross
Major: Biology
Faculty Sponsor: Dr. Roger Reidelberger
Research Title: ***Effects of Different Intermittent Peptide YY (3-36) Dosing Strategies on Food Intake, Body Weight, and Adiposity in Diet-Induced Obese Rats***

Sustained reduction in caloric intake in obese individuals has been shown to produce steady weight loss. The method of administration of anorexigenic agents is paramount to the early steps in identifying anti-obesity drugs. Thus, the main aim of this study was to identify an intermittent dosing strategy for intraperitoneal infusion of peptide YY (3-36) [PYY (3-36)] that produced a sustained reduction in daily food intake and adiposity in diet-induced obese rats. Over the 9-wk testing period, none of the 15 PYY (3-36) dosing regiments produced a sustained 15-25% reduction in daily food intake for greater than 5 days, but body weight and adiposity were reduced by 12 and 43%, respectively. Furthermore, the declining inhibitory effects of PYY (3-36) administration were found to be due to the activation of a potent homeostatic response, rather than a down-regulation of receptors.

Eric Ruchensky
Major: Political Science
Faculty Sponsor: Dr. Erika Moreno
Research Title: ***State Ownership of the Energy Industry in Latin America***

The third wave of democracy in Latin America largely coincided with the adoption of neoliberal economic policies in the region. But neoliberalismo supplanted dependencia fleetingly, with many countries returning to economic policies involving nationalization of important industries over the past decade. This study utilizes pooled-time series analysis to consider civil liberties, political rights, and income inequality as causal factors explaining the variation in state ownership of the energy industry in seventeen Latin American countries over the period 1990-2007. This study supports the hypothesis that countries recognizing fewer civil liberties are more likely to have nationalized energy industries.

Megan Ruhland
Major: Biology and Spanish
Faculty Sponsor: Dr. Mark Reedy
Research Title: ***Understanding TIMP-2's role in Cardiac Neural Crest Migration***

Neural crest (NC) cells are a population of cells that migrate from the neural tube of the embryo early in development. One subpopulation of NC cells, called cardiac NC cells, migrate to the developing heart and assist in the construction of a functioning cardiac system. TIMP-2 is a protein known to be expressed in cardiac NC cells. TIMP-2 can activate pro-MMPs and also participates in integrin binding which can trigger intracellular signaling pathways. To further investigate the role integrin binding plays in migration, I express a mutant TIMP-2 in the cardiac NC. This mutant is unable to activate pro-MMPs, but still binds integrins.

Elizabeth Schwarzkopf
Major: Biology
Faculty Sponsor: Dr. Dustin Stairs
Research Title: ***Effects of Novel Environments on Ethanol Drinking Behavior in Rats***

Research Abstracts

Alcohol abuse is widespread in our society and few effective treatments exist for alcohol addiction. The purpose of the present study was to determine if environmental enrichment during development alters the propensity of rats to drink ethanol over water using a two-bottle choice drinking procedure. Rats were raised in either an enriched condition (EC) or an isolated condition (IC). All rats acquired drinking behavior through the use of a sucrose-fading procedure and were then tested in their preference for either a 10% or 5% ethanol solution or water. This study found that environmental enrichment had no effect on either preference for ethanol or volume of ethanol consumed at both doses of ethanol tested.

Kristy Schwarzkopf
Major: Exercise Science
Faculty Sponsor: Dr. G. Patrick Lambert
Research Title: ***Effect of the Menstrual Cycle on Gastrointestinal Permeability***
This study assesses the effect of menstrual cycle phase on gastrointestinal (GI) permeability using the permeability probes lactulose, sucrose, and rhamnose. Six females with regular menstrual cycles acted as subjects in this study. Each subject ingested a solution containing the three permeability probes once a week for four weeks. Urine was collected from the subjects on each testing day. It was then analyzed for permeability probe content to determine GI permeability. This study will be useful in evaluating past and future studies involving the effect of exercise on GI permeability in females.

Nadia Sebastian
Major: Chemistry
Faculty Sponsor: Dr. Jim Maher, Mayo Clinic College of Medicine
Research Title: ***Variant Eukaryotic HMGB Proteins to Complement Repression Loop Formation in E. Coli Lacking HU***

DNA flexibility and loop formation are important to the gene regulation and recombination in eukaryotic organisms, and are similarly important to Escherichia coli. Architectural proteins, like bacterial heat unstable (HU) or eukaryotic high-mobility group B (HMGB), are thought to enhance DNA flexibility. Previous experiments using an in vivo DNA looping assay in E. coli cells show that the yeast HMGB protein Nhp6A can restore DNA looping in HU deficient cells, but similar human HMGB2 box A derivatives cannot. We hypothesized that modifying box A of the human HMGB2 protein to make it more like Nhp6A would allow variants to enhance DNA flexibility and found that the addition of Nhp6A-derived positively-charged leader sequences did in fact restore DNA looping.

Allison Showalter
Major: Physics
Faculty Sponsor: Dr. Jack Gabel
Research Title: ***A Spitzer Space Telescope Infrared Spectral Study of Quasar Outflows***

Infrared spectroscopy from NASA's Spitzer Space Telescope is used to investigate energetic outflows from broad absorption line quasars (BALQSOs). The evolutionary theory models the BALQSOs as one step in galactic evolution of quasars. The orientation theory models the active galactic nucleus of the quasar surrounded by an obscuring torus. We compare the infrared continuum emission and ionic line strengths for BALQSOs and normal quasars to test for physical differences in the quasars' environments. We note immediate discrepancies in the presence of bumps at 10 and 18 microns in our BALQSO sample. Further diagnostic testing is necessary to reach conclusive evidence for the models.

Research Abstracts

Bethany Smith
Major: Journalism and Mass Communication-Public Relations and News Tracks
Faculty Sponsor: Dr. Eileen Wirth
Research Title: ***The Buzz About Viral Marketing***

Why so serious? What's 'G'? Anybody who asked these questions was a viral marketing target. Viral marketing uses social-networking to spread the word of a product or event by creating a buzz, causing the target audience to use word of mouth to spread it. It is uncostly and widespread when successful.

In an effort to understand this relatively new form of marketing, I virally promoted the return of DJs to 96.5 the Buzz in Kansas City. Through the creation of a bee character, interconnected websites and man on the street promotions, I executed what became known as "The Angry Bee Campaign."

Elizabeth Songy
Major: Biology and French
Faculty Sponsor: Dr. David Vanderboegh
Research Title: ***Molière Through the Ages***

Through a clever combination of humor, hyperbole, and social commentary, Molière brought respectability to comedic theater. Traditionally, critics considered comedic theater as insignificant and mindless slapstick, fit for no one but commoners and other social outcasts. However, when Molière began to show society its flaws in uproariously funny plays such as *Le Malade Imaginaire* (The Imaginary Invalid) and *Tartuffe ou l'Imposteur* (Tartuffe, or the Hypocrite), he demonstrated the power of comedy and its method of revealing truths about oneself and one's society. Molière's impact reverberates now, as exemplified in Jean-Marie Poiré's 1993 movie *Les Visiteurs* (The Visitors).

Research Abstracts

Kara Stockdale
Major: English and Spanish
Faculty Sponsor: Dr. Fidel Fajardo-Acosta
Research Title: ***Voices of the Voiceless: The Challenge to Dominant Discourse in Literary Representations of Latina Immigrants***

This project examines negative representations of Latina immigrants in U.S. popular culture and the challenge to such views posed by recent literature that sheds light on the reality and humanity of a group of people often trapped behind stereotypes and misconceptions. My research draws from the ideas of Michel Foucault and Raymond Williams and seeks to better understand how the discourses of power in U.S. culture often demonize immigrants. The literature I address includes recent works by Helena Maria Viramontes and Sonia Nazario and also John Steinbeck's The Grapes of Wrath, a landmark work in the lending of a voice to (im)migrant workers in the context of American economic history.

Tiffany Tsai
Major: Biology
Faculty Sponsor: Dr. Karin van Dijk
Research Title: ***A Tandem Affinity Purification Strategy to Isolate Proteins Interacting with Type III Chaperones***

Type III secretion systems (T3SSs) are essential to the virulence of many bacterial pathogens. and are used to inject a battery of bacterial proteins, effectors, into host cells to ultimately cause disease. A subset of effectors needs the aid of others proteins, type III chaperones (TTCs), for injection in host cells. How TTCs facilitate secretion of their cognate effectors is mostly unclear. The overall objective was to develop a purification method for the isolation of TTCs and interacting proteins from the plant pathogen Pseudomonas syringae, using a known chaperone-effector pair: ShcA/ HopA. Our initial tag TAP (tandem affinity purification) (Sepharin et al 1999) was cleaved in vivo. We now

have successfully isolated HopA from P. syringae, using another tandem affinity tag (Cer-tag) fused to ShcA.

Brandon Vaca
Major: Biology and Theology
Faculty Sponsor: Dr. Richard Miller
Research Title: ***Conversion of the Rich: Seeing "Good" in the Good News***

Jesus's death and resurrection, words and actions, and manner of being reveal the Good News and cause joy among the preferred addressees, the poor. Not all contents and implications of this Good News, however, are received as "good" by the rich. To receive the Gospel message and its modern day implications with joy, the rich must be converted to solidarity with the poor. In responding to the evangelization offered by the poor, the rich are freed to receive the Good News with joy.

Christopher Vacek
Major: Exercise Science
Faculty Sponsor: Dr. Anthony Bull
Research Title: ***Reproducibility of a Simulated 20-km Time Trial in Competitive Cyclists***

Reliability of cycling performance is difficult to measure in the field for several reasons related to weather conditions, especially wind. This study will evaluate the reproducibility of a laboratory based 20-km time trial (TT) in competitive cyclists ages 19-55. Subjects will complete a 20-km TT by attaching their own bicycle to the CompuTrainer load generator. Each subject will return for two additional 20-km TT separated by at least 48 hours in exactly the same manner. Heart rate will be measured continuously throughout the TT and cool-down. Plasma lactate concentrations will be measured at 10-km, 20-km, and 3 min post-TT.

Research Abstracts

Kristin Wakin
Major: Chemistry
Faculty Sponsor: Dr. Janet Seger
Research Title: ***Particle Production in Photonuclear Interactions***

As a member of the Solenoidal Tracker at RHIC collaboration, I analyzed data taken by the Relativistic Heavy Ion Collider (RHIC), which smashes two opposing beams of gold nuclei traveling at relativistic speeds. I studied ultra-peripheral collisions, which occur when the nuclei miss each other completely yet there is still a photonuclear interaction between the ions, during which rho-meson particles can be created. Cross sections for rho-meson production at 130 and 200 GeV have been measured, so by studying data at 62 GeV, I hoped to add an additional measurement to the energy dependence studies of the rho-meson cross section.

Tricia Watson
Major: Mathematics
Faculty Sponsor: Dr. Lance Nielsen
Research Title: ***Calculus Teaching Methods***

This project analyzes Calculus teaching styles in order to determine the most effective method of instruction. Four teacher's classrooms were observed with a focus on examining student-teacher interactions, approaches to explaining material, and the overall class structure. Conclusions were drawn from previous research on the subject and the grade distributions by teacher of the standardized final exam given to all Calculus students. As expected, the ideal method of teaching Calculus in a college setting involves different aspects of each teacher's style, and the most effective method of teaching can be constructed by combining the strengths of all four teachers.

Research Abstracts

Anastasia Yanchilina
Major: Atmospheric Sciences
Faculty Sponsor: Dr. Jon Schrage
Research Title: ***Statistical Analysis of the Correlations between the Seat Surface Temperatures and the West African Monsoon Precipitation in Western Sahel, Central Sahel, and Guinea Coast Regions***

West Africa has experienced considerable interannual and interdecadal climate variability, with drought dominating most of the last three decades and a trend towards increased precipitation in recent years. The climatic conditions in these marginal climate zones have important implications for human populations, including food security, public health, and fresh water management. Correlation analysis has identified regions of strong relationship between precipitation indices in the three homogeneous spatial regions and SSTs in the Atlantic and Indian Oceans. Foremost, warmer SST anomalies in the Guinea Gulf (10°W-10°E, 0-5°N) correlate with precipitation in the Western and Central Sahel climatic regions with a coefficient of 0.5 as demonstrated but inversely correlate with precipitation in the Guinea Coast climatic region with a coefficient of -0.4. Furthermore, warmer SSTs in the tropical Indian Ocean negatively correlate with precipitation in the Guinea Coast, Western Sahel, and Central Sahel climatic regions as shown with a coefficient of -0.3 for the former and -0.5 for the latter two regions. Results presented identify whether these correlations are a consequence of annual or decadal variations.

Research Abstracts