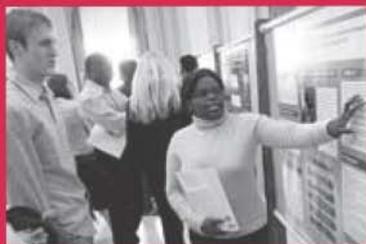


Undergraduate Symposium

Celebrating research,
creative endeavor and
service-learning

ABSTRACTS 2011



WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON

Undergraduate Symposium 2011

Celebrating Research, Creative Endeavor and Service-Learning

**University of Wisconsin–Madison
Memorial Union
April 12, 2011**

- 9:00–10:15 a.m. Session I: Talks, Roundtables, Project Displays,
Art and Posters
- 10:30 a.m.–Noon Session II: Talks, Roundtables, Project Displays,
Art and Posters
- Noon-1:00 p.m. Great Hall
Welcome to Student Participants
Aaron M. Brower, Vice Provost for Teaching
and Learning
- Celebrating Undergraduate Education
at a Research University*
Paul M. DeLuca, Jr., Provost and Vice
Chancellor for Academic Affairs
- Undergraduate Research Awards Ceremony*
Kelli Keclik, Public Services Librarian
College Library
- Performances
- 1:15–2:30 p.m. Session III: Talks, Roundtables, Project
Displays, Art and Posters
- 2:45–4:15 p.m. Session IV: Talks, Roundtables, Project
Displays, Art and Posters
- 4:30–5:00 p.m. Gallery Talk: Theater Galleries, 2nd floor across
from Play Circle Theatre

Refreshments will be available throughout the day in Tripp Commons.

A Special Thanks!

We would like to thank the faculty and staff for promoting academic and creative excellence and for making the Undergraduate Symposium possible through their roles as mentors and sponsors. We would like to thank the student participants and the many individuals who have helped to organize this symposium. It has been a great team effort.

A special thanks is also extended to Stephanie Diaz de Leon and Ruthi Duvall of The Wisconsin Union; Melissa Tedrowe of the The Writing Center; Kent Hamele, Nancy Rinehart, and Linda Kietzer of University Communications; Jeff Crucius of the Division of Information Technology; Patricia Iaccarino, Kelli Keclik, Pamela O'Donnell, Sarah McDaniel, Carrie Cruz, and David Luke at the College Library; and Karen Lederer and Jan Lucchesi of the College of Letters and Science, Student Academic Affairs.

2011 Undergraduate Symposium Organizing Committee

Jane Harris Cramer, Laura Hewitt (coordinator), Maya Holtzman, Svetlana T. Karpe, Linda Kietzer, Laurie Mayberry, Janice Rice, Julie Stubbs, and Beth Tryon.

Cover photos provided by the Office of University Communications.

Undergraduate Symposium 2011

Celebrating Research, Creative Endeavor and Service-Learning

University of Wisconsin–Madison

April 12, 2011

The 13th annual Undergraduate Symposium is a celebration of undergraduate students' accomplishments across the many schools and colleges at UW–Madison. The Symposium includes presentations, posters, performances and displays by groups and individuals representing the arts and humanities, biological sciences, physical sciences, and social sciences. These original works showcase the vast range of talent and creativity within the university's undergraduate population.

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Congratulations!

.....
The Undergraduate Symposium has become the premier campus-wide event showcasing our students' incredible talents in research and scholarship, creative works, and community involvement. I want to congratulate you on your achievement, and I want to encourage you to explore the accomplishments of your colleagues. Leaf through this abstract booklet and take a look at others' work presented and displayed throughout the Union today.

We take great pride in what you have done and take every opportunity to brag about you. Former Symposium presenters have gone on to brilliant careers in academia, law, medicine, business, the arts, and the sciences. We look forward to hearing what you accomplish next. Again, congratulations and enjoy the day!

Aaron M. Brower, Ph.D.
Vice Provost for Teaching and Learning
Professor, School of Social Work
Harold C. Bradley Faculty Fellow

DESIGNING ADAPTIVE EDUCATIONAL AGENTS

Anika Abid, Bilge Mutlu (Mentor), Computer Sciences

Studies of intelligent instructional software have shown improvement in academic achievement and student motivation. Recent advances in technology have allowed us to go beyond the use of on-screen software and use human-like robotic agents. These human-like robotic agents were envisioned to become educational agents. Our research goal is to design education agents that employ techniques that instructors use in classroom settings to elicit attention and reinforce learning. These techniques include a variety of body gestures such as moving arms up and down, shifting the body from left to right, nodding, and even turning in circles to improve the participant's engagement. Using an electroencephalography (EEG) headset, our system monitors attention and employs the appropriate techniques to facilitate it.

BASELINE CELL SIZE MEASURED IN CARDIOMYOCYTES DERIVED FROM INDUCED PLURIPOTENT STEM CELLS

Aneela Alamgir, Timothy Kamps (Mentor),
Physiology/Regenerative Medicine

Hypertrophy is the enlargement of individual myocytes that is often observed in Pompe disease. Our goal in this study is to use a human induced pluripotent stem (iPS) cell technology to generate human cardiomyocytes with Pompe disease to examine hypertrophy. Since these cardiomyocytes have never experienced mechanical load, any hypertrophy (increase in cell size) will be an intrinsic phenomenon caused by the mutation and cellular Pompe pathology rather than a reactive hypertrophic phenomenon where the cell increases its myofilament content to cope with increased contractile demand. In order to understand cardiac hypertrophy in disease, we measured cell size of two iPS cell lines, IMR-90 and 19-9-11, two lines that serve as control. This baseline data will then be used to compare with Pompe derived cardiomyocytes to understand hypertrophy.

FACULTY SATISFACTION AT THE UNIVERSITY OF WISCONSIN–MADISON

Joseph Anderson, Jennifer Sheridan (Mentor), WISELI

To assess UW–Madison faculty job and salary satisfaction by gender and broad discipline (biological science, social studies, etc.), while also looking at the factors that contribute and detract most from faculty satisfaction at the UW–Madison, I use data from the 2010 Study of Faculty Worklife instrument (respondent rate of 55.5%). T-tests are used to assess the significance of group differences by gender and broad discipline, while open-ended coding provides details about the top factors of satisfaction and dissatisfaction. The data suggests that overall, most faculty were very satisfied with their jobs and that majority of faculty indicated that they were ‘somewhat unlikely’ or ‘very unlikely’ to leave the UW–Madison. The intent of this work is that UW–Madison administrators use these findings to improve working conditions for UW–Madison faculty.

GEOGRAPHICAL DISTRIBUTION OF FOLIAR TANNIN PRODUCTION IN *POPULUS TREMULOIDES*

Stacy Apazeller, Kennedy Rubert (Mentor), Entomology

Trembling aspen (*Populus tremuloides*) exhibit differences in secondary phytochemistry within and among regional populations, presumably as a consequence of selective pressures (eg., climate, soil quality, herbivory) acting throughout those populations. One class of these phytochemicals, the condensed tannins, is associated with plant defense against environmental stress and herbivory. This study examines the geographical distribution of tannin production among *P. tremuloides* clones in populations from the United States (Colorado, Wisconsin) and Canada (Alberta). The abundance and distribution of foliar tannins in Wisconsin and Colorado populations are similar, with levels of 13 ± 5 and 11 ± 4 percent dry weight, respectively. These observations suggest that different combinations of selective pressures can result in similar regional patterns of tannin production.

ROLE OF FISH IN SUPPORTING THE PRODUCTIVITY OF AFRICA'S LAKE TANGANYIKA

Iлона Argirion, Peter McIntyre (Mentor), Zoology

Peter McIntyre and his lab focus on ecology and conservation in rivers and lakes around the world. The team studies how animals affect ecosystem productivity and nutrient dynamics to aim to reveal fundamental patterns and processes in aquatic ecosystems in hopes of contributing to the discovery of new species and global-scale patterns of biodiversity. The project I have been working on deals with near shore productivity of the fish in Africa's Lake Tanganyika. To understand this reciprocal relationship, I'm processing fish that were previously collected in the lake and preparing them for elemental analysis. Although we have yet to retrieve results, the next step is to identify elemental patterns within their biochemistry, hopefully shedding light into the role of fish in supporting the productivity of this lake.

DETERMINING THE ROLE OF D. MELANOGASTER GENE "FUCT-A" IN REGULATING PAIN PERCEPTION

Ashley Arthur, Shannon Ballard (Mentor), Genetics

Understanding the molecular mechanisms of pain perception is crucial for several diseases including cancer and diabetes. *Drosophila melanogaster* is an ideal model organism to study pain because it shares many genes involved in neuronal development with vertebrates, including humans. From a genetic screen, a mutant stock (s89) has been demonstrated to display a decreased aversion to noxious heat stimuli as the neurons are unable to promote pain perception. I mapped this mutation to the FucT-A gene, but FucT-A's function in regulating pain perception has not yet been classified. I hypothesize that FucT-A has a role in promoting pain perception. I have generated a *Drosophila* stock with a wild-type FucT-A gene that can be expressed in a tissue specific manner. I am now testing which cell type(s) requires FucT-A expression by rescuing the pain perception phenotype in s89 mutants. I will also knock down endogenous mRNA levels of FucT-A in wildtype larvae in a tissue/cell specific manner and measure the pain perception response. These studies will address where FucT-A expression is required to regulate the perception of pain.

THE BIRTH OF A MOVEMENT? BAGUA AS A CASE OF PERUVIAN INDIGENOUS AMAZONIAN MOBILIZATION

Amjad Asad, Christina Ewig (Mentor), Political Science

In February 2009, the Peruvian government voted on the Forestry and Wildlife Law, a trade deal with the United States that would expand American access to the Amazonian region. As part of the agreement, the Peruvian Congress would amend laws that govern access to the natural resources abundant in the area, which hosts some 400,000 indigenous persons. Not surprisingly, Peruvian indigenous groups cited concerns that foreign governments would exploit their sacred homeland. As such, indigenous communities began protesting the law in April 2009 in the northern town of Bagua. Initially peaceful, these protests turned violent when an undetermined party began shooting. This project asks if the events in Bagua signify the birth of an indigenous movement in Peru, a country that scholars have often pointed to for its lack of indigenous organizations. If so, what factors explain this radical change?

THE PRIVATIZED STATES OF AMERICA? PRIVATE PRISONS AS A MEANS TO REGULATE IMMIGRATION

Asad Asad, Kathryn Sanchez (Mentor), Spanish and Portuguese

This project highlights the role of the private prison industry as a tool to regulate immigration to the United States. The goal is to explore questions about the relationship between private and human rights, specifically if the proliferation of private prisons has increased the number of indefinite detentions and precipitous deportations. This has been accomplished in the following ways by tracing the development of immigration policy from the seventeenth century to present-day, focusing especially on the evolution of detention and deportation practices. By drawing from case studies from Florence, Arizona—where three private prisons operate simultaneously in this high-traffic region—the research demonstrates the importance of regulating this industry for the protection of migrants’—both authorized and not—fundamental rights.

INVESTIGATION OF AVANT-GARDE

Melanie August, Beverly Gordon (Mentor), Design Studies

My senior thesis is an investigation into the concept of avant-garde fashion of the last 50 years. I employ fashion history books, magazines and articles to understand the evolvement of avant-garde fashion through certain garments that I have chosen. I used this information to create my own definition of the “avant-garde” term based on other peoples definitions, the events surrounding each garment and their impact the fashion industry. My research will produce a chronological look at the advancements in fashion relating to history, trends and new design. I will use this research to conduct my own trend forecast based on the fashion of the past three years.

THE AMERICAN DREAM

Casey Ayala, Rachel Bozich, Ronald Daley, Marc Pedone,
Erica Halverson (Mentor), Curriculum and Instruction

Four young students strive to represent their understandings of the American dream through narrative, various interviews, and analyzation of the current and past generations. Each student does this through his or her personal experiences or stories of their upbringings, creating vivid descriptions of what the American Dream truly means. Each story contrasts with one another, displaying different views and perceptions of what the American Dream means to each student. Finally, the piece wraps up with a series of interviews which compare and contrast different generation’s ideas of what the American Dream is, showing how it has evolved throughout time.

SUBSTRATE STIFFNESS AFFECTS CONTRACTILITY OF STEM CELL-DERIVED HEART MUSCLE CELLS

Mehmet Badur, Sean Palecek (Mentor),
Chemical and Biological Engineering

After a heart attack, the heart becomes much stiffer as scar tissue develops, forcing the heart to work less efficiently. Studies have already shown that heart cells placed on very stiff material will beat for shorter periods of time and mature incorrectly. We have shown that material stiffness directly affects the performance of stem cell-derived heart cells. Stem cells turned into heart cells were placed on to gels that allow us to measure how hard they beat. Our results show that the cells beat with similar force to rat heart cells. Because our heart cells beat similar to an animal model, we can say material stiffness affects the cells and they can “feel” their environment.

CHEMTEACHER: AN ONLINE RESOURCE FOR CHEMISTRY TEACHERS FROM CHEMED DL

Gerad Bandos, Sarah Brendzel, Peggy Linzmeier, Yiqing Liu, Yan Luo, John Moore (Mentor), Chemistry

ChemTeacher is a compact, unified internet package that links to online teaching and learning materials for specific topics in the high school chemistry curriculum. Resources have been vetted to be scientifically accurate, pedagogically defensible, and easily accessible, usually at the click of a single button. Whether a new teacher, substitute teacher, or long-seasoned teacher in new circumstances, any educator will be able to use ChemTeacher to strip time away from search engines and resource codices and reinvest that time for efficient lesson planning, effective instruction, and meaningful assessment. A teacher can select the level appropriate for a class, and the resources provided can be implemented in whatever way the instructor chooses.

MGAT2 DEFICIENCY IN MICE INCREASES ENERGY EXPENDITURE AND COMPENSATORY FOOD INTAKE ON LOW-FAT DIETS

Taylor Banh, Chi-Liang Yen (Mentor), Nutritional Sciences

Bodyweight is maintained by balance of food intake (FI) and energy expenditure (EE). Acyl CoA: monoacylglycerol acyltransferase-2 (MGAT2) regulates energy balance. Mice deficient in MGAT2 (Mogat2^{-/-}) have increased EE and, unlike wildtype littermates, are protected from obesity induced by high-fat feeding. On low-fat diets, they exhibit both increases in EE and FI, resulting in normal bodyweight. We tested our hypothesis that increased EE leads to compensatory increased FI, allowing Mogat2^{-/-} mice to maintain bodyweight. When FI of Mogat2^{-/-} mice was limited to the level of wildtypes, they lost weight significantly, indicating lacking MGAT2 results in compulsory increases in EE. Thus, MGAT2 regulates energy balance, primarily through modulating energy expenditure. Regulating MGAT2 activity in humans may prove to be useful for treating body weight-related health problems.

ONLINE SAFETY EDUCATION FOR PARENTS AND CHILDREN

Kaitlin Bare, Megan Moreno (Mentor), Pediatrics

Today's youth are using the internet at younger ages. This increases their vulnerability to threatening aspects of being online. Little research exists that examines the effectiveness of intervention materials to promote discussions between parents and their kids about online safety issues. Based on a review of relevant scientific literature, educational materials, and marketing principles, I developed an online safety booklet. Thirty parents with children between ages 7–12 will be surveyed about how they discuss online safety with their kids. The child will be given the booklet. The parents are then contacted two weeks later and asked about their discussions with their children. The goal is to determine the effectiveness of using an educational book as an intervention to promote parent-child discussions about online safety.

CONFRONTATION

Kailey Barthel, Sophia Flood (Mentor), Art

This landscape is one that reflects a bleak and inhospitable environment, dealing with issues of censorship through the imagery of book burning. I used charcoal to illustrate the emptiness of the scene and suggest the burnt debris of this event. Although no living things are depicted, I hoped to give the objects personalities or characters. Each book is individual, and the piles seem to grow and build off one another, as if they were about to topple over. The matches perhaps show their personas more obviously. They stand upright on their own, bending toward the books and illustrating their quietly dangerous characters, as if threatening destruction. Cases of censorship like book burnings mark oppression of ideas and traditionally destroy cultural heritage, history, and thought.

UPSLOPE MOVEMENTS OF BIRD SPECIES IN MONTEVERDE AS A RESULT OF DIRECTIONAL CLIMATE CHANGE

Kristina Bartowitz, Anjali Kumar (Mentor),
CIEE Tropical Ecology and Conservation Program

Directional climate change has shown upslope movements of bird species in observational and theoretical studies in the Monteverde Cloud Forest, Costa Rica. However, this phenomenon has not been studied in great detail. In order to fully understand the effects of climate change on species composition, more thorough observation must take place. This study attempts to record the composition of bird species in four life zones in Monteverde. These results were compared to compositions of 17 years ago in the same life zones to determine changes in species composition. My findings show a significant percentage of upslope movement in the birds of Monteverde. There is a need for more comprehensive observational studies of upslope movements in birds in tropical montane habitats to determine higher resolution elevational ranges in order to develop and implement successful conservation methods.

A SECONDARY ANALYSIS OF MILD TRAUMATIC BRAIN INJURIES SUFFERED BY WISCONSIN HIGH SCHOOL ATHLETES

Brian Batko, M Alison Brooks (Mentor), Orthopedics and Rehabilitation

The word concussion comes from the Latin word *concutere* meaning “to shake violently” and is the most common form of intracranial injury. In sports medicine, concussions are technically referred to as mild traumatic brain injury (MTBI); however, the term is used interchangeably with concussion. The objectives are: 1) to conduct a systematic review of identified articles describing MTBI, or concussions in Wisconsin high school athletes and 2) perform a secondary data analysis of concussive injuries sustained in a cohort of high school basketball and football players. It is hypothesized that the return to play (RTP) time will have increased in comparison to trials conducted 10-15 years ago. The concussion data was collected as a part of a larger randomized control trial (RCT). Results for athletes sustaining sports related concussions (SRC) will be gathered and organized by grade (9–12), level (freshman, junior varsity, varsity), sex, frequency of concussion compared to total number of injuries, location of injury (practice or competition), as well as frequency of concussion per 1,000 athletes in the given sport. This study aims to characterize the time to RTP in high school athletes compared to previously reported RTP standards.

ABSORPTION SPECTROSCOPY

Daniel Bautista, Scott Sanders (Mentor), Mechanical Engineering

This project focuses on the development of H₂O absorption spectroscopy systems for use in combustion engines. The goal is to create a system that would be capable of obtaining high speed measurements as well as a high signal to noise ratio through a variety of different wavelengths of light. This system would be able to accurately measure the H₂O mole fraction, temperature, and pressure inside of a combustion engine and would have tomography capabilities. The creation of such a system would enable for more accurate work to be done in the field of combustion research which would in turn allow for more efficient engines to be created.

THE EFFECT TRIPS HAD ON SMALL- AND MEDIUM-SIZE INDIAN PHARMACEUTICAL FIRMS

Ben Beduhn, Shubha Ghosh (Mentor), Law

The Agreement on Trade Related Aspects of Intellectual Property (TRIPS) is one of the most contentious trade agreements formed under the WTO and is the largest reform to international intellectual property rights (IPR) in all of history. Perhaps no other sector was impacted as drastically as the Indian pharmaceutical industry, which relied on near non-existent patent laws prior to TRIPS. This study looks at what effects the TRIPS Agreement and Indian IPR reform had on the small- and medium-sized pharmaceutical firms in India. Data was collected through interviews with pharmaceutical executives and patent lawyers in India. Several impact models are suggested and further research questions posed.

TESTOSTERONE IN HAIR: POTENTIAL INSIGHT FOR POLYCYSTIC OVARY SYNDROME IN GIRLS

Andy Beine, David Abbott (Mentor), Obstetrics and Gynecology

This study aims to develop a better understanding of the origins of the female reproductive and metabolic disorder, polycystic ovary syndrome (PCOS). One possible factor is excess testosterone (T) production by the fetal ovaries. The first part of this study uses the analysis of scalp hair samples from newborn baby girls to test the hypothesis that T concentrations are elevated during fetal development in female newborns of PCOS women. The second part uses rhesus macaque monkeys and T implants to develop a timeline for T deposition in scalp hair. Results have yet to be determined, but if successful, this method could be used to identify girls at risk for PCOS and allow pediatricians to monitor their development.

HOME SCHOOL CONNECTEDNESS

Courtney Belawich, Rebekah Lemahieu, Kyle Miller, Thomas Murphy, Janean Dilworth-Bart (Mentor), Human Development and Family Studies

The purpose of this qualitative study was to explore mothers' perspectives on home-school connections to understand the variable ways families engage with schools in early childhood. Forty mothers with preschool aged children participated in one-on-one semistructured interviews concerning their children's school preparation. Thematic analyses of interviews identified salient themes of home-school connections including: a backpack connection, school as a resource, ongoing dialogue with teachers, a space to advocate, and partnership is a privilege. Findings from this study support that practices related to home-school connections begin prior to entering kindergarten and may be influenced by a family's access to cultural capital. Implications are offered for early childhood educators and family outreach personnel to help support school connectedness in early childhood and beyond.

FREE-LIVING TERRESTRIAL NEMATODES INDICATE DECOMPOSITION PATHWAYS OF AQUATIC INSECT SUBSIDIES

Breann Bender, David Hoekman (Mentor), Entomology

Aquatic insects connect aquatic and terrestrial food webs. Each summer at Lake Mývatn in northeast Iceland, billions of midges (Chironomidae) emerge and swarm over the shore to mate and die. Their carcasses become available to soil arthropods and nematodes. As fungal and bacterial decomposers respond to midge inputs, fungal and bacterial feeding nematodes are expected to respond in turn. Nematodes were extracted from long- and short-term research plots. Nematode densities were higher in plots one year following midge addition but were not elevated during the year of midge addition or two years following midge addition. The response of free-living terrestrial nematodes to midge inputs allows us to better understand decomposition pathways by which aquatic insects enter terrestrial ecosystems.

SIX- AND 11-MONTH-OLD INFANTS' ABILITY TO DIFFERENTIATE DIALECTS IN THEIR NATIVE LANGUAGE

Libby Benson, Kristin Shutts (Mentor), Psychology; Jenny Saffran (Mentor), Psychology; Jan Edwards (Mentor), Communicative Disorders

The present study investigated infants' ability to detect speech variations within their native language. Dialects are one such variation differing in pronunciation, vocabulary and grammar. Six- and 11-month-old infants listened to one dialect of English. Then, they heard the familiar dialect alternated with a new dialect. Infants' listening times to each dialect was recorded. Similar to previous research, 6-month-old infants differentiated the dialects. Data collection for 11-month-old infants is still underway, but we hypothesize 11-month-olds will differentiate between dialects. Previous studies found 11-month-old infants cannot distinguish dialects when presented with one-word speech tokens. However, infants in the present study hear continuous speech, and therefore receive richer dialectical information. Infants' ability to differentiate dialects is interesting because dialects can reveal linguistic and social information about speakers.

MEASURING IN VIVO INTRACELLULAR CA²⁺ LEVELS UPON VIRAL INFECTION

Kristine Benson, Robert Striker (Mentor), Medicine

In order to measure the intracellular Ca²⁺ levels post viral infection, a HEK293T stable cell line of Aequorin transfected cells was created. Upon binding with Ca²⁺ in the presence of O₂ and colenterazine, Aequorin turns into Apoaequorin and emits blue light ($\lambda = 469\text{nm}$). Both light emissions and Ca²⁺ flux were measured in the Luminometer for both Dengue Virus (Type 2) infected cells and uninfected cells. The Dengue Virus infected cells showed significantly lower levels of intracellular Ca²⁺ than the uninfected cells. Calcium flux was much greater in the Dengue Virus-infected cells than in the uninfected cells indicating a higher level of unbound Aequorin. Cell lysis and other cell disturbances should also be considered as possible factors altering intracellular Ca²⁺ levels *in vivo*.

MODIFYING AN AR DNA VACCINE TO ENHANCE ANTIGEN PRESENTATION AND AUGMENT ANTI-TUMOR IMMUNE RESPONSE

Anatoli Berezovsky, Douglas McNeel (Mentor), Medicine

The androgen receptor (AR) is a protein expressed by prostate cancer cells that plays an essential role in the development and progression of prostate cancer. A DNA vaccine targeting the AR has previously been shown to elicit a modest anti-tumor immune response *in vivo*. We are trying to enhance the anti-tumor efficacy of this vaccine, testing the hypothesis that by enhancing peptide presentation, we will elicit a stronger anti-tumor immune response. By modifying the AR DNA vaccine to enhance degradation and presentation, we aim to increase the presentation of AR-derived peptides, thus enhancing AR-specific immune responses and anti-tumor efficacy of the AR vaccine. After identifying the modification with the greatest peptide presentation *in vitro*, we plan to test its anti-tumor efficacy *in vivo*.

PARALLEL MESH MERGING

Nathan Bertram, Timothy Tautges (Mentor), Engineering Physics

Computer generated meshes are used by computational scientists to run simulations by discretizing partial differential equations over a mesh. However, large meshes need to be generated in pieces, while the simulation requires a contiguous mesh. Due to memory and time constraints, identifying shared vertices cannot be done in serial on sufficiently large meshes. Using MOAB (Mesh Oriented datABase), a mesh handling component with a C++ interface, an algorithm has been developed to identify these shared vertices in parallel. This algorithm utilizes a proximity comparison to determine equivalent vertices. As a result, storing merging information between processors simplifies the processing of the resulting merge and contributes to the analysis of parallel meshes.

THE EFFECTS OF THG-1 ON CARDIAC HYPERTROPHY

Drew Birrenkott, Eugene Kaji (Mentor), Cardiology

TRÁ is a key molecule in the regulation of heart cell hypertrophy. When it is bound with its ligand, T3, it causes physiological hypertrophy by thickening the heart wall. This hypertrophy is achieved (partially) through an increase in α MHC production. In a yeast two hybrid screen, another protein found in the heart, Tsc-22 Homologous Gene 1 (THG-1) bound to TRÁ. Studies in other systems show that THG-1 serves as a transcriptional repression factor. We hypothesize, therefore, that when THG-1 binds to TRÁ, it decreases physiological hypertrophy. To test this hypothesis we will analyze the physiological interaction of THG-1 and TRÁ through transfection assays and the biochemical interaction through a GST-pulldown assay. The results of this study may elucidate a novel interaction in the physiological hypertrophy pathway.

PERSONALITY AND FACEBOOK

Kelly Bogard, Ashley Beutler, Kelly Bogard, Taryn Francel,
Janelle Gabrielsen, Darcy Riley, Sun Kang (Mentor),
Human Development and Family Studies

Social networking sites are an easy way to stay connected and communicate with others as well as express one's self. The current research was designed to examine the associations between personality characteristics and Facebook usage. Furthermore, the purpose is to explore the associations between personality and Facebook jealousy, controlling for gender. Participants will include undergraduate students at the University of Wisconsin–Madison, recruited by an online survey. The Facebook jealousy scale (Muisse et al, 2009) will be used to measure level of jealousy while personality traits will be measured by using the Five Factor Model (Ross et al, 2009). Data collection will be completed by April 1, 2011. We hypothesize that extroverts will tend to have more back and forth communication with others they see on a daily basis through Facebook than introverts. However, both extroverts and introverts will have the same amount of Facebook use and be exposed to jealousy through the use of Facebook, but extroverts will experience a heightened level of jealousy.

DEEP PYROSEQUENCING IDENTIFIES RHESUS MACAQUE MHC HAPLOTYPES ASSOCIATED WITH RESISTANCE TO SIV

Patrick Bohn, Roger Wiseman (Mentor), Primate Research Center

The highly polymorphic class I genes encoded in the Major Histocompatibility Complex (MHC-I) allow host adaptive immune responses to recognize and destroy virus-infected cells. Specific MHC-I alleles are known to confer exceptional resistance to HIV/AIDS in humans and Simian Immunodeficiency Virus (SIV) pathogenesis in nonhuman primates. We are applying high-throughput Roche/454 GS Junior pyrosequencing to retrospectively characterize MHC-I haplotypes in a cohort of over 200 Indian rhesus macaques (*Macaca mulatta*) with known outcomes after SIV challenge in studies performed previously at WNPRC. MHC-I haplotypes will be compared with levels of SIV replication to search for additional genetic associations with disease resistance. Our results will allow improved control of MHC-I factors in vaccine development studies and could provide new insights into protective immune responses against SIV.

SYNERGISTIC EFFECTS OF THE UNFOLDED PROTEIN RESPONSE AND TLR-4 IN IFN- β EXPRESSION

Ashley Bomkamp, Judith Smith (Mentor), Pediatrics

In recent years, Endoplasmic reticulum (ER) stress and the Unfolded Protein Response (UPR) have been implicated in a variety of diseases and disorders, ranging from diabetes to neurological disorders. Despite this, relatively little is known about the mechanisms involved in immune system activation by ER stress. To investigate this, ER stress and the UPR will be induced using chemicals and levels of Interferon β will be measured using Q-PCR to quantify the amount of immune system activation. It has been found that induction of ER stress by LPS and TPG lead to significantly higher IFN- β production. The implications of this are still being studied and complete knowledge of the exact mechanism could lead to potential treatments.

GENE EXPRESSION OF DOWN SYNDROME–INDUCED PLURIPOTENT STEM CELLS

George Bonadurer, A. Bhattacharyya (Mentor), Waisman Center

Down syndrome (DS) is a chromosomal condition caused by an extra 21st chromosome and is the leading genetic cause of mental retardation. Research of DS mouse models has demonstrated a connection between abnormal neurogenesis and overexpression of certain genes on chromosome 21. An innovative method to study DS in a human system involves using induced pluripotent stem cells generated from DS and non-DS skin cells and facilitating differentiation of these cells and examining variation through the stages of neural development. Quantification of gene expression by microarray and qPCR was performed, and several genes were significantly overexpressed in DS cells. Furthermore, several of these overexpressed genes were found on chromosome 21. Future research will examine overexpression of these genes throughout the stages of neural development.

WITH CLICKERS, IT'S THE QUESTIONS AND NOT THE TECHNOLOGY THAT LEAD TO LEARNING

Amanda Boris, Jeffrey Henriques (Mentor), Psychology

While student feedback on the use of clickers in the classroom has been positive, evidence in the literature of their impact on test performance has been mixed. The utilization of clickers and how often they were used and their impact on test performance was examined from 5,796 students across 19 sections of introductory psychology over an eight-year time period. Examination of performance within ten classes using or nine classes not using clicker failed to show any difference in students' grades across groups. However, test performance in sections where questions were used frequently revealed a significant improvement in grades, compared to sections that used questions less regularly. Results support the hypothesis that while clickers are useful tools for student learning, it is the quizzing effect reflected in the number of questions asked, not the device itself, that has a positive impact on test scores.

PHA LAK PHA LAM IN POPULAR PRACTICE: HOW THE RAMAYANA IS LIVED IN LAOS

Amy Bowers, Katherine Bowie (Mentor), Anthropology

One of the most popular epics in South Asia, the Ramayana has been told the world over. One telling of the story in Laos is called Pha Lak Pha Lam. Lao Studies scholars have mostly examined its textual representation. The emphasis on textual understanding, however, occurs at the expense of acknowledging how the story is localized through oral and visual means. This research seeks to engage questions of how the story is situated within the context of local practices, and what mediums of transmission facilitate and maintain the life of the story. Through ethnographic fieldwork in Laos, this research traces popular practice of Ramayana storytelling to better understand the multiplicity of how the story is lived and passed along in a local cultural context.

EFFECTS OF AGONISTS AND ANTAGONISTS ON INSULIN SECRETION

Harpreet Brar, Michelle Kimple (Mentor), Medicine

Insulin produced in the β -cells of the pancreas is necessary to regulate blood glucose levels. In diabetes, there is a defect in insulin secretion from the β -cells. A key component to the regulation of insulin secretion is signaling through G protein coupled receptors (GPCRs), which function in transducing changes through receptors on the membrane. We focus on the E prostanoid family of GPCRs, which act through the modulation of cyclic AMP (cAMP) production. cAMP is synthesized from ATP by adenylate cyclase and promotes insulin secretion. Activation of the EP3 isoform of the E prostanoid receptor specifically activates the G protein, G_z, which inhibits adenylate cyclase. In this study, we use different treatments to inhibit EP3 and G_z, increasing cAMP and ultimately increasing insulin secretion.

UNDERSTANDING BEST'S DISEASE MECHANISMS DUE TO A CYTOPLASMIC POINT MUTATION

Simran Brar, De-Ann Pillers (Mentor), Pediatrics

Anions like Cl⁻ regulate various important cellular events for both excitable and non-excitable cells. In the retina pigment epithelium (RPE), a Ca²⁺ activated Cl⁻ channel was identified and mutations in the gene product known as bestrophin was shown to be the cause of an inherited eye disease called Best's disease. Although many mutations of this ion-channel have been studied for their functional alterations leading to disease mechanisms, we are interested in studying a recently reported novel mutation (N296H) in one of the cytoplasmic amino acids. We created a point-mutation by site-directed mutagenesis and compared its structure and function by ectopic expression in HEK cells. We expect to use our findings to model the actual disease mechanism using cultured human RPE cells.

ALTERED SPACES SERIES, UNTITLED #3

Rebecca Bratton, Sophia Flood (Mentor), Art

I interpreted the project to be where the natural world meets the structured world, and chose to include flowers to stand in for people. The ferris wheel in this piece represents the structural world, a place for people to escape and have fun. The flowers in the piece represent the natural world and the way people just overtake what the structural world has to offer. By using oil pastel and allowing the messy quality to show through, I think it communicates the chaotic idea of the flowers overtaking the scene. I want the piece to be chaotic but have movement throughout. I am interested in the way the two parts of my image interact and are also in discord.

ARABIC VERB ASYMMETRY AND OVERT PRONOUNS

Katie Bray, Rebecca Shields (Mentor), Linguistics

In Modern Standard Arabic (MSA), verbs in SVO sentences agree with their subjects in person, gender, and number, while verbs in VSO sentences agree only in person and gender. Using data the author has gathered, this paper examines two analyses in Elabbas Benmamoun's 1998 article "Agreement Asymmetries and the PF Interface," that propose explanations for this asymmetry: one involving incorporation and the other involving government. This paper compares MSA and Moroccan Arabic, a dialect that does not exhibit this asymmetry. The two analyses also make different predictions about whether the presence of an overt pronoun after a verb in a MSA VSO sentence will result in ungrammaticality. The data suggests that such sentences are ungrammatical, which supports the prediction made by the incorporation analysis.

DARK MATTER DETECTION WITH DM-ICE: PREPARING FOR A NEXT GENERATION DETECTOR AT THE SOUTH POLE

Benjamin Broerman, Karsten Heeger (Mentor), Physics

Dark Matter is postulated to compose 23 percent of the Universe, but has yet been conclusively observed. Recent measurements by the DAMA (Dark MATter) experiment have laid claim to its detection, though still unverified. In December 2010, a new prototype dark matter detector, named DM-Ice, developed at the University of Wisconsin, was deployed in the South Pole ice. Its goal is to serve as a feasibility study for a future, larger detector, providing a check of the reported DAMA signal. Currently, the DM-Ice detectors are taking data at the South Pole. R&D and simulation for the next generation experiment are in progress. I will report on my work with the analysis of the data and planned tests of the crystals used in the DM-Ice detectors.

COMPARING APPLES TO ORANGES TO FRUIT: HOW DO INFANTS CATEGORIZE THE MEANINGS OF WORDS?

Tracy Brookhyser, Jenny Saffran (Mentor), Psychology

How do infants learn, differentiate, and group meanings of words? We will investigate this process, semantic categorization, by presenting infants with two novel objects and cues to their meaning. These cues will include the sound the object makes as it moves and the object labels. Sometimes cues will conflict. For example, two objects that make the same sound will have different object labels. Looking time will be used as a measure of learning. We hypothesize that naming different objects with distinct labels will facilitate learning, whereas naming different objects with similar labels will inhibit learning. In addition, if the two objects make different sounds as they move, this may further facilitate categorization of the objects. We will investigate discrepancies in the existing developmental literature, as well as expand current knowledge of semantic categorization.

PEROMYSCUS MANICULATUS AND MICROTUS PENNSYLVANICUS SHOW NO HABITAT DIFFERENTIATION IN BIOCORE PRAIRIE

Lauren Brooks, Janet Batzli (Mentor), Institute for Biology Education

Two rodent species *Peromyscus maniculatus* and *Microtus pennsylvanicus* are known to coexist within prairie ecosystems. Despite overlapping resource requirements, I hypothesized that these species exhibit habitat differentiation, with *M. pennsylvanicus* found in higher abundance in areas of high ground cover and litter accumulation, whereas *P. maniculatus* would be found in higher abundance in areas of lower litter in Biocore Prairie. Using a mark-recapture method, four transects of twenty traps each were set in locations that varied in plant height and high to low litter levels for a total of thirteen nights. With a high abundance of 152 animals captured, I found no statistical difference in abundance of the two species based on plant height and litter density, or based on plant species present.

PERCEIVED AND ACTUAL CUES OF DECEPTION

Jessica Brostowicz, Lauren Harris, Bilge Mutlu (Mentor),
Computer Sciences

It has been said that the average person tells as many as eleven white lies per week. Deception is often a vague area of study without definite answers, however there are many cues that may suggest that deception is taking place. In this experiment verbal, nonverbal, and paraverbal behavior and personality observations were assessed and categorized into 1) cues, 2) interpersonal processes, 3) personality, 4) development, and 5) the situation, to more fully examine how these categories affect the success or failure of a lie. A broad survey of deception literature has been conducted to administer correct placement of the cues. However, results from these studies suggest that there is not a specific factor that indicates deception, but rather a collaboration of multiple cues that may, but not always, lead to the deception of deceptions. Our findings have proved to be largely situational, but present a sound foundation of data for future experiments to be conducted upon.

LEVERAGING THE FAMILY BRAND IN STRATEGIC MARKETING

Erin Brucks, Tyler Mielke, Debra Holschuh-Houden (Mentor),
Family Business Center

Utilizing their family brands correctly, family businesses can reach a broader target market and persuade consumers to choose a family-branded product over their respective counterparts. Through a literature review, case studies, and interviews with local family businesses we will explore different marketing strategies and determine which factors contribute to a successfully family-branded product. We aim to develop a better understanding of the competitive advantage and value creation generated by family brands. Our research will lead to recommendations for other family businesses on how to leverage their family brand as an intangible asset in today's economy.

IN BETWEEN

Brittany Bruening, Sophia Flood (Mentor), Art

I have always been interested in the afterlife as an ambiguous entity and universal idea. What is often overlooked is the state of in between. What would that place look like, and is it the same to every person? How does one remain in between? Is it a pleasantry or a terror? Through visual representation, I hope to explore the idea of transience.

STRATEGIES FOR INCORPORATION OF BOTTLE BIOLOGY INTO THE HOMES AND CLASSROOMS OF YOUNG SCIENTISTS

Tom Bryan, Paul Williams (Mentor), Plant Pathology

Using would-be trash and common household items, Bottle Biology incorporates discovery and inquiry-based scientific thinking into an engaging and humble skill, gardening. Different learning objectives and methodologies are required to best adapt Bottle Biology's capabilities to different educational environments. To measure the relative effectiveness of developed strategies, online surveys requested of educators (teachers and parents) and formative assessment records will provide feedback. Proposed strategies include: a community-run experiment; tailored instructions and activities; guiding ideas for experiments; and an accompanying recycling program. Further adaptability of Bottle Biology can stimulate its use in the community of science education and get future scientists nurturing life, wondering, and investigating.

MAPPING OF DEFECTS IN RNAI INHERITANCE IN *C. ELEGANS*

Albert Budhipramono, Nicholas Burton (Mentor), Genetics

RNA interference (RNAi) is a process that blocks gene expression. RNAi-induced phenotypes can be epigenetically inherited by a complex mechanism involving numerous proteins. To find genes essential to the machinery, *C. Elegans* worms are randomly mutagenized. Worms unable to inherit RNAi-induced phenotypes are isolated by exposure to small RNAs and observing phenotypes. By comparing mutants' DNA sequence to wild-type through restriction digests, mutation sites are narrowed down to a range of DNA which is then sequenced. RNAi is observed in various organisms; its evolutionary conservation across species suggests an essential role. Identifying genes involved in RNAi allow greater understanding of its biological importance.

WOMEN'S RIGHTS IN POST-CONFLICT AFRICA: THE CASE OF CONGO-KINSHASA

Michael Burns, Aili Tripp (Mentor), Political Science

In the last decade, more people have been killed in the Congo than in Iraq, Afghanistan, and Darfur combined. Despite a peace agreement being signed, large numbers of women have been brutally raped by militia. Such a digression is an exception in Africa. Aili Tripp is researching post-conflict African countries, where there are twice as many female legislators than in non-post conflict African countries, and where there is increased women's rights legislation. As an Undergraduate Research Scholar, I am reinterpreting rare French audio of Congolese women, politicians, and women's rights activists who were interviewed last year. Because of my reexamination, Dr. Tripp can more accurately work with the interviews to better understand why Congolese women's rights have not kept pace with other post-conflict countries in Africa.

LEAVING YOUR FAMILY'S BUSINESS

Grace Bush, Andrew Merino, Debra Holschuh-Houden (Mentor),
Family Business Center

This project is a case study on John Robbins and how he was born into a multi-million dollar family business, but left the company to pursue a life he found more rewarding. We will analyze how growing up in a family business fostered an environment for John to disregard the family business product, and campaign against it. We will research other family businesses where the children have walked away from mass amounts of wealth in order to pursue personal dreams, how it affects the family, and the implications this has on the family business.

EXPRESSION OF ANTIGEN SPECIFIC GENES IN PROSTATE CANCER CELL LINES

Brianna Byers, Joshua Lang (Mentor), Medicine

The field of tumor immunology has made important advances for the treatment of cancer. Recently immune based therapies have improved survival in patients with advanced prostate cancer. The vital step in creating an anti-tumor immune response is the expression of antigens by the cancer cell. New drugs, alone or in combination, may enhance expression of these antigens. This study seeks to investigate potential target antigens for anti-tumor vaccines and the extent to which different treatments can induce expression of these identified targets. We will focus on the expression of the cancer-testis gene family in DU145, LnCaP, VCaP, LAP-C4, and RWPE1 cell lines. These cell lines will be treated with epigenetic modifying agents and assayed for gene expression with RT PCR. The results of these experiments will be the basis for future research and development of prostate cancer vaccines.

DEVELOPMENT OF A NEAR INFRARED IMAGING SYSTEM TO MONITOR ALGAE INTERCEPTORS

Alexander Campbell, Chin-Hsien Wu (Mentor),
Civil and Environmental Engineering

A multispectral near-infrared imaging system (NIRIS) was developed to measure algae concentrations in Lake Mendota to enhance monitoring of new algae interceptor systems implemented at area beaches. Conventional monitoring techniques using in situ measurements are limited in their spatial and temporal resolution. NIRIS uses a near-infrared camera and series of filters to isolate specific bandwidths of light which algae reflects and absorbs, allowing algae to be quickly identified and measured. A field calibration method was developed to relate filtered image intensity to corresponding algae concentrations under different lighting conditions. During testing, water from Lake Mendota was diluted to provide a controlled range of algae concentrations. A strong relationship between variables was established, suggesting that NIRIS is capable of providing reliable spatial algae concentration measurements.

YES AND LYN ARE NECESSARY FOR EGFR NUCLEAR TRANSLOCATION IN CETUXIMAB RESISTANT CELLS

David Campbell, Deric Wheeler (Mentor), Human Oncology

The epidermal growth factor receptor (EGFR) is a ubiquitously expressed receptor tyrosine kinase (RTK) and is recognized as a key mediator of progression in human epithelial tumors. Following more than twenty years of preclinical development two monoclonal antibodies targeting the EGFR have gained FDA approval (panitumumab and cetuximab). Despite clinical success of cetuximab, many tumors manifest resistance to cetuximab. Previously we have shown that nuclear EGFR leads to resistance to cetuximab. In this report we show that two members of the Src family kinases (SFKs), Yes and Lyn, are critical for nuclear translocation of the EGFR manifesting in resistance to cetuximab. This work provides data strengthening the rationale for blocking SFKs concomitantly with cetuximab to circumvent the manifestation of resistance.

EFFECT OF BROWSING ON FIBER AND LIGNIN CONTENT IN TREMBLING ASPEN (POPULUS TREMULOIDES)

Erika Cardenas, Kennedy Rubert (Mentor), Entomology

Excessive deer browsing has been linked to declines in trembling aspen (*Populus tremuloides*) populations, prompting interest in identifying factors which influence susceptibility of *P. tremuloides* to browsing. Fiber and lignin levels are often negatively associated with palatability and nutritional value of forage material. Using a common garden study including four *P. tremuloides* strains, we investigated how the fiber content of *P. tremuloides* would respond to simulated deer browsing and whether the saliva left behind had any effect. Browsing induced significant increases in foliar fiber content ($p < 0.05$) across all four genotypes, suggesting that browsing may lead to decreases in the palatability of *P. tremuloides*. This study furthers understanding of how *P. tremuloides* adapts to selection pressures.

INVESTIGATING THE EFFICACY OF SYSTEM 44

Caitlin Carranza, Matthew Davis, Leslie Epstein, Jennifer Radle,
Melinda Leko (Mentor), Rehabilitation Psychology and Special Education

The purpose of this study is to investigate the efficacy of the System 44 reading program, which provides explicit computer-based reading instruction for adolescents with disabilities. The project utilizes a group experimental design with 73 students assigned to intervention and 45 assigned to control condition. Students were pre-and post-tested on three sub-tests of the Woodcock Johnson. Teacher-level data were also collected in the form of classroom observations and teacher interviews. The data were analyzed using quantitative and qualitative methods. Preliminary analyses indicate students in the intervention condition were more engaged in classroom instruction and teachers like the program and believe it is meeting their students' needs. Final results can help inform the field of special education and reading instruction at the secondary level.

DETERMINING IF NOVEL MRI METHODS CAN DETECT AND PREDICT OUTCOMES OF TRAUMATIC BRAIN INJURY

Brianne Cassidy, Craig Levenick (Mentor), Neurology

Traumatic brain injury (TBI) is a major cause of death and disability worldwide. The main objective of this project is to characterize evolving cortical alternations after TBI and, through novel MR imaging methods, to discover predictors for post-traumatic epilepsy (PTE) and post-traumatic stress disorder (PTSD). To account for genetic predisposition, experiments are performed on two unique rat strains that have been selectively bred as either "fast" kindling susceptible or "slow" kindling resistant. After TBI, video-EEG monitoring is used to determine which rats develop PTE and MRI and histological methods are used to assess brain structure abnormalities. This project is also attempting to therapeutically reduce PTE and PTSD after TBI by brief treatment with 2DG, a glucose analog with "neuroprotective" qualities.

FOOD PHOTO DIARIES AS A TOOL TO RAISE AWARENESS AND MOTIVATE PEOPLE TO EAT LOCAL FOOD

Jordan Chacon, Lydia Zepeda (Mentor), Consumer Science

Food photo diaries are found to have a motivational effect on food choices and diets. They act as a self-monitoring tool by providing a visual image of the amount of food/calories consumed for consideration. I want to ask how these diaries influence food decision-making and eating habits, and how they might work to get people thinking about their eating behaviors in terms of environmental and community health (sustainability). Particularly I am interested in assessing whether they might raise awareness and motivate people to eat local food. Continuing in my pilot study, my next steps will be to do more research design and arrangement of the logistics with the intention in the near future to begin interviewing subjects and analyzing my results.

EFFECTS OF HYPOXIA ON HUMAN OVARIAN CANCER CELL GROWTH

Pan San Chan, Jing Zheng (Mentor), Obstetrics and Gynecology

Most cancer cells reside under hypoxia ($\leq 1\%$ O₂) *in vivo*. However, our current knowledge on cancer cells is largely built on cell models established under 21% O₂. To closely mimic *in vivo* condition, herein, we investigated effect of low O₂ on cancer cell growth using human ovarian cancer cell lines (SKOV-3 and OVCAR-3) established under 21% O₂. Our results showed 1% O₂ culture for six days significantly decreased cell numbers by 5.4 and 11.0 fold, respectively for SKOV-3 and OVCAR-3, as compared with 21% O₂. These data suggest that 1) these cancer cells have adapted to the higher O₂ levels and 2) establishing cancer cell lines closer to their *in vivo* O₂ levels might be necessary for better understanding cancer cell behaviors *in vivo*.

RELATIONAL STUDIES BETWEEN TWITTER AND POLITICS

Jane Chapman, Dhavan Shah (Mentor),
Journalism and Mass Communication

Twitter is a social network that exchanges news and opinions through 140 character “tweets” in real time. Growing use of Twitter by politicians and followers has prompted our study of how/why people employ Twitter for political purposes. We began by archiving Twitter data from over 200 House of Representative candidates in the 2010 midterm elections that included each tweet’s content, time sent, source, and background information of the sender. Two weeks before the elections, we added a second subset of archives following senate and gubernatorial candidates. We have analyzed our findings in a series of papers examining Twitter’s network and sentiments of defeated candidates. Our studies will provide insight into these developing relationships to understand the implications of brief network communications in political discourse.

S.C. JOHNSON: A FAMILY COMPANY BUILT TO LAST

Tony Chau, Debra Holschuh-Houden (Mentor), Family Business Center

In the world of business, the chances of your family firm lasting five generations is very slim; for it to remain competitive is even slimmer. S.C. Johnson is a company that has defied these odds and done just that. I will look at the S.C. Johnson business model to determine how they were able to overcome problems with succession which plagues many family businesses and also how the company has evolved and grown to what it is today. It has survived many economic downturns through its history such as the Great Depression and the most recent recession a few years ago, and I want to show that it is the strong family involvement in the company that has been the key ingredient to its success. The findings will provide current and future participants in family firms with insight on how a model company like S.C. Johnson addressed family issues within the business and what is needed to ensure the survival of a business across many generations.

ENDOCROCIN, A POSSIBLE VIRULENT FACTOR THAT IS REGULATED BY LAEA IN ASPERGILLUS FUMIGATUS

Yiming Chen, Fang Lim (Mentor), Medical Microbiology and Immunology

Aspergillus is a group of fungi closely related to human-beings. They produce antibiotics, alcoholic drinks and various industrial enzymes, but also contaminate food and jeopardize people's health. *Aspergillus fumigatus* is an opportunistic pathogen that infects immunocompromised individuals. Disease progression is often dictated by the dynamic interplay between fungal virulence factors and host immune responses. Secondary metabolites or more commonly known as mycotoxins are speculated to be one of the many contributing factors of invasive *aspergillosis* (IA). LaeA is a global transcriptional regulator that controls about many secondary metabolite gene clusters in *Aspergillus spp.* Our project shows that none of these LaeA-regulated gene clusters produce a secondary metabolite known as endocrocin. My project involves investigating the production or localization of endocrocin in different developmental structures of *A. fumigatus* and we found that endocrocin is conidial-specific. Future studies will include various stress-tests and virulence tests of endocrocin which are designed to explore the putative function of this metabolite.

VEGF REGULATION OVER THE MURINE IMMUNE RESPONSE TO MYCOBACTERIUM INFECTION

Yuli Chen, Jeffrey Harding (Mentor), Pathology and Laboratory Medicine

Mycobacterium tuberculosis, the cause of tuberculosis, kills 2 million people each year. In response to infection, the host forms granulomas, special collection of immune cells that kills and contain bacilli. Understanding Granuloma biology is essential for understanding tuberculosis pathology. In a protein screen for factors elevated in the granuloma during infection, we identified Vascular Endothelial Growth Factor (VEGF). To understand VEGF's role in the granuloma during infection we used pharmaceutical and genetic approaches. We inhibited VEGF with an RTK inhibitor, and infected genetically altered mice with natural decreases (HypoVEGF) in VEGF activity with mycobacterium. The results show that VEGF has a previously unappreciated role in the immune response to mycobacterium including T-cell and macrophage activation, as well as the formation and maintenance of granulomas.

COUNTY-SPECIFIC NET MIGRATION ESTIMATES BY AGE, SEX AND RACE 2000–10

Cheng Cheng, Richelle Winkler (Mentor),
Community and Environmental Sociology

The purpose of this project is to construct a database of net migration estimates by age, sex, and race/ethnicity for all United States counties for the period 2000–10. The project prepares county level net migration estimates using the residual method. Net migration estimates are calculated as the difference between the observed population at Census 2010 and the expected population at Census 2010 given natural increase (births and deaths) as collected from the National Center for Health Statistics vital statistics. The completed database will serve as the only publicly available data post-2000 on age-specific county migration. It will be essential for demographers to generate population estimates and projections and for researchers to examine how selective migration shapes counties' population compositions and affects local service needs.

ENHANCED CARDIAC DIFFERENTIATION OF HYDROGEL ENCAPSULATED STEM CELLS BY BONE MORPHOGENETIC PROTEIN-4

Shahzad Chindhy, Wendy Crone (Mentor), Engineering Physics

Stem cell-derived cardiomyocytes are a potential source for transplantable cells to treat people with heart diseases. This study focuses on optimizing cardiomyocyte differentiation from stem cells using a combination of physical and chemical stimuli—hydrogel matrix stiffness combined with growth factor BMP-4. While past research has examined the effects of BMP-4 on stem cells in 2-dimensional culture, the effects of using BMP-4 on hydrogel encapsulated stem cells is entirely novel. Based on preliminary results, administration of 20 μ g/mL of BMP-4 combined with hydrogel matrix stiffness of 3.4kDa (10%) increases efficiency of cardiomyocyte differentiation when compared to cells only receiving mechanical stimulation.

THE ROBOT AS A PERSUADER

Sang Heum Cho, Bilge Mutlu (Mentor), Computer Sciences

In the future, the robot will play roles such as salesclerk, museum guide, and information desk. Therefore, it is important to investigate what aspect of communication makes the robot most effective in real-life situations. Our study specifically focuses on how the robot can express its preferences and the ways to improve the robot's persuasion skills. Thus, we are setting an experiment exploring how the robot's verbal and nonverbal cues affect people's economic decisions-making. Based on the literature search, we extracted a list of cues, and each cue will be tested in an experiment. We hypothesized that when the robot uses those cues, it will more effectively convey its preference.

THE BRIGGS-RAUSCHER CHEMICAL OSCILLATING REACTION: INVESTIGATIONS TO REDUCE FORMATION OF IODINE VAPOR

Kenton Chodara, Bassam Shakhashiri (Mentor), Chemistry

The Briggs-Rauscher reaction is a good demonstration tool that oscillates between multiple colors. In an attempt to refine the reaction, various alterations to the traditional recipe were tested. Currently, hazardous iodine gas is produced as an undesired end product. In an effort to make the reaction safer and more portable by preventing the vapor formation, the effect of using different amounts of various components (chosen through correspondence with Dr. Stanley Furrow of Penn State) was examined. Preliminary results indicate that the desired result of no iodine gas production was not achieved.

GLOBAL DISTRIBUTION OF DIFFUSED IONIZED GAS IN MILKY WAY GALAXY

Nitish Chopra, Lawrence Haffner (Mentor), Astronomy

After a year of observations from its new location on Cerro Tololo, the Wisconsin H α Mapper (WHAM) has nearly completed survey observations below $\delta < -30^\circ$. This new data combined with the Northern Sky Survey provides the first kinematic, all-sky survey of diffuse H α from the Milky Way. Aside from many large-scale, locally-ionized regions, much of this emission arises from the warm ionized medium, a diffuse but thick component of the ISM that extends several kiloparsecs into the galactic halo. Here, we present our early efforts at reducing this new southern dataset and offer a first look at the global distribution and kinematics of diffuse ionized gas throughout the galaxy.

COMPUTATIONAL MODELING PERCEPTION OF MOVEMENT

Jason Chuang, Amir Assadi (Mentor), Mathematics

A challenge in brain research is to discover the neuronal mechanisms underlying motion perception. The brain can use partial information about an object to infer the geometric properties and motion of the object. In this project, we provide a computational model for motion perception of objects that are represented by patch of moving dots against different backgrounds. The model uses distributed computations by ‘artificial neurons’ that work together in a network. This computational model allows us to perform various ‘what if’ scenarios and help discover the constraints that could diminish brain’s correct estimation of motion. For example, we find the relationship between the errors in perception of the true motion of an object versus decreasing the visual information that is provided to the brain.

CONTEXTUAL MODULATION OF VISUAL SPEED PERCEPTION

Jason Chuang, Xin Huang (Mentor), Neuroscience

Visual contexts can influence visual motion perception. Previous studies showed that background motion in the same or opposite direction of a moving center-stimulus could reduce or increase, respectively, the perceived speed of the center-stimulus. These speed illusions were explained previously by directional interactions between motion components. In this human psychophysical study we found that, surprisingly, the perceived speed of a center-stimulus increased significantly when a “background” pattern moving in the orthogonal direction was introduced. Furthermore, we found that the perceived speed of the center-stimulus depended on the size and the noise level of the background stimulus. These results suggest that the speed perception is influenced by the overall “motion energy” in the visual scene and provide new insight into the neural mechanism underlying speed perception.

TWO TYPES OF STRUCTURAL BRAIN DAMAGE CONFER DIFFERENTIAL LEVELS OF PTSD RISK IN COMBAT VETERANS

Michele Coleman, Sterling Johnson (Mentor),
Geriatrics and Adult Development

The association between traumatic brain injury (TBI) and post-traumatic stress disorder (PTSD) is limitedly understood. In combat veterans, we predicted TBI status and structural damage would correlate positively with PTSD diagnoses. Structural MRI scanning and PTSD testing were completed on twenty-two veterans, eight with TBIs and fourteen controls. A condition-blind visual search for focal contusions (FC) and diffuse axonal injury (DAI) was conducted on T2mpgre scans. T-tests showed TBI veterans had more FC ($p=.041$), DAIs ($p=.029$), and PTSD diagnoses ($p<.001$) than controls. Spearman’s correlations showed TBI status and PTSD status correlated positively ($r=.701;p<.001$). FC status correlated with PTSD status ($r=.437;p=.021$), while DAI did not. This indicates that one form of TBI-induced damage, FC, is associated with increased PTSD risk, while another form, DAI, is not.

SUCCESSION PLANNING IN FAMILY BUSINESS

Skyler Conrad, Debra Holschuh-Houden (Mentor), Family Business Center

According to the Small Business Administration only 30 percent of all family-owned businesses survive into the second generation. This project aims to determine the best practices for successfully passing a family business on to a second generation while maximizing wealth retention for the family. I will analyze both succession planning from the perspective of what is best for the business and estate planning from the perspective of what is best for the family. After researching academic and industry resources, as well as interviewing a lawyer, I will determine what the best methods are for successfully passing on the business while maximizing wealth retention for the family.

EFFECTS

Elizabeth Cook, Thomas Berenz (Mentor), Art

Socially conscious art is something I hope to begin to delve into with my work on the affects of pollution. Global warming is a relevant issue that needs to be addressed. I hope to draw more attention to its importance as it relates to our present and future atmosphere and environment. Pollution is something that we can control as long as we are conscious of the impact we are making on the world, and are motivated to change it. In my project I hope to create a melancholic feel to the effects pollution has caused in our environment.

EFFECTS OF DIVORCE ON ACADEMIC ACHIEVEMENT AND PERCEPTIONS OF MATHEMATICS AND SCIENCE

Angela Costanza, Janet Hyde (Mentor), Psychology

The current study aims to examine adolescent academic performance and attitudes about mathematics and science courses as a function of their parents' marital status: divorced or intact family. Furthermore, the role of parent-child interactions as a moderator will also be studied. Using data collected from the Wisconsin Study of Families and Work, parents and their 18-year-old children will be used as participants. Data will be collected by evaluating GPAs, WKCE scores, and course enrollment from school records, and coding adolescents' self-assessments of parent-child interactions, interest and utility value perceptions of math and science courses. It is hypothesized that adolescents with divorced parents will do worse academically and exhibit less interest and positivity about parent-child interactions, mathematics, and science compared to children from intact families.

TOWARDS COLLECTIVELY ENCODING QUANTUM INFORMATION IN COLD HOLMIUM ATOMS

Jacob Covey, Mark Saffman (Mentor), Physics

The study of quantum information and quantum computation has become ubiquitous in the field of atomic physics, and laser-cooled neutral atoms serve as an ideal system to study quantum bits and quantum gate operations. This work aims to increase the computing power of the neutral atom quantum computer by working towards encoding quantum information within atoms of the rare-earth element holmium. Holmium has not been previously laser cooled, and the focus of this work is the efforts to demonstrate cold holmium atoms for future application to quantum computation.

CONSEQUENCES OF LIGNIN MODIFICATION IN BIOFUEL POPLAR: PEST RESISTANCE AND ARTHROPOD DIVERSITY

Michael Crossley, Richard Lindroth, Christine Buhl (Mentor), Entomology

In response to high costs and associated problems of reliance on foreign oil, interest in alternative energy sources, such as biofuel, has soared. Economic and environmental concerns have driven much biofuel research to explore cellulosic ethanol derived from woody biomass of forest trees as an alternative to corn grain-derived ethanol. Genetic modification of poplar could potentially increase efficiency of conversion of cellulose to ethanol. Concurrent effects on other aspects of poplar chemistry could, however, increase susceptibility to insect pests and decrease insect diversity in biofuel poplar stands. Relationships between foliar chemistry and insect community composition at a recent transgenic poplar stand will be studied and implications for commercial production of transgenic poplar for biofuel will be discussed.

NEURAL STEM CELL TRANSPLANTATION TO IMPROVE STROKE RECOVERY IN A RAT STROKE MODEL

Olivia Crowell, Matthew Jensen (Mentor), Neurology

Dr. Jensen's lab is investigating how neural stem cells regenerate brain tissue in rat stroke models. Pre- and post-stroke, behavioral testing compares motor coordination and contra lateral functioning in rats. Stroke is induced by surgery. Following surgery transplantation of neural stem cells are injected into the brain. After perfusion, brain slices are stained through immunohistochemistry or cresyl violet to stain for different types of cells. Stereology counts the cells that were regenerated from neural stem cells. Different neural stem cell injection methods are being researched for effectiveness. Preliminary results provide that neural stem cells have differentiated into new cells inferring new brain tissue regeneration may be possible in human stroke patients.

CENTRAL NERVOUS SYSTEM REGENERATION

Isabel Cupino, Bermans Iskandar (Mentor), Neurological Surgery

The regenerative properties of folate that are being researched in Dr. Bermans Iskandar's lab have shown to play a crucial role in the repair of the adult CNS after injury. In rodents that underwent a spinal cord injury, axon regeneration was found to depend on the high affinity folate receptor. The effect of folate correlated closely over the range of dose amounts and gene-specific DNA methylation, suggesting an epigenetic mechanism in CNS repair. With further research, the results could provide valuable information that would open up numerous possibilities for new treatments for CNS injuries.

WHAT FACTORS MAKE A CONTINUING EDUCATION PROGRAM IN LONG-TERM CARE SUSTAINABLE OVER TIME?

Kristin Czarny, Barbara Bowers (Mentor), Nursing

In many areas of clinical practice, continuing education programs for staff have proven effective in the short-term, but have been largely unsuccessful in sustaining practice change. In an attempt to determine the factors that make a program sustainable over time, more specifically that of a continuing education program in long-term care, I conducted a literature review. I found that while there is an overall lack of research in this area, the few available studies addressing this issue identify environmental and system supports, such as follow-up support and networking opportunities, as important factors contributing to sustained practice. Additional research is needed to provide a more thorough understanding of these relationships, but these studies have and will continue to guide further research in this area.

AN INSIGHT ON HOW ARTISTS MAY ACHIEVE FINANCIAL SUSTAINABILITY AND ACTIVELY PARTICIPATE IN SOCIETY

Jonatas Dasilva, Leslee Nelson (Mentor), Liberal Studies and the Arts

The project aims to help artists achieve financial sustainability in their creative careers. An intrinsic purpose of the project is to combat the socially constructed stereotype of the starving artist, and show that there is a series of steps which have often led artists to achieve financial sustainability. My personal role is to survey those artists, gather information on their practical knowledge about making a living through creative careers, and contrast those findings with the goals and expectations of current art students. In addition to these findings, I will be showing a series of artwork which seek to illustrate the role of the artist as an observer in society, and to demonstrate how artists may be contextualized and actively participate in today's world.

CLEAN WATER TECHNOLOGY BUSINESS IMPLEMENTATION IN ORONGO KENYA

Claire Davis, Shannon Lisowe, Norm Doll (Mentor),
Civil and Environmental Engineering

Non-governmental organizations like Engineers Without Borders (EWB) face the challenge of finding the best strategy for implementing projects that combine charity and sustainability. Our implementation of biosand filters in rural Kenya provided students in EWB-UW an opportunity to learn about these challenges and make conclusions about what is the best way to incorporate new technology and community health education into a project that fosters business concepts and independence. Successful collaboration with a group of ambitious locals, business design for AFGO Filters, and construction of the steel mold necessary for filter construction supports the idea that projects can be established to help communities “help themselves.” Plans for long-term monitoring and evaluation will provide more evidence or lack thereof to the effectiveness of the project in terms of its social and technical implications. This information is advantageous to students and groups trying to establish projects in developing countries.

FACEBOOK WITH A FIT OUTLOOK

Angela Davis, Megan Moreno (Mentor), Pediatrics

Social networking sites (SNSs) are increasingly significant in adolescents’ lives. The purpose of this study was to explore influences of nutritional messages on SNSs. This study included interviews with three nutrition professors and surveys of 20 university freshmen. Questions examined participants’ views on the impact of nutritional messages displayed on SNSs. Professors reported that SNSs may be a source of useful nutritional information, although they do not currently use SNS to find nutritional information. They expressed concern regarding perceived credibility of nutritional messages. Ninety percent of the surveyed freshmen use Facebook; 60% think nutritional messages would be helpful. Findings suggest health messages could be effective on SNSs. A credible organization could successfully promote healthful habits through this communication tool.

TREATMENT OF CHALLENGING BEHAVIOR BY PARENTS OF CHILDREN WITH DISABILITIES VIA VIDEOCONFERENCING

Anna de la Cotera, Wendy Machalicek (Mentor),
Rehabilitation Psychology and Special Education

Past research suggests that performance feedback may contribute to improved treatment adherence for parents of children with challenging behavior, but behavior specialists and families may find the cost and time involved prohibitive. This study evaluates the effects of performance feedback provided via video tele-conferencing (VTC) on parent acquisition and generalization of intervention strategies across desired family routines for parents of children with developmental disabilities who engaged in challenging behavior. Based on the results of functional analyses and multielement treatment comparisons, interventions were selected and implemented by parents with performance feedback via VTC. The effects of parent implemented intervention on challenging behavior will be evaluated using a multiple baseline across participants design. Data on the efficacy of parent implemented intervention is to be collected.

THE WHEELZ

Gabriel De Los Reyes, Christopher Walker (Mentor), Dance

“The Wheelz” is a 15-minute one-man Hip-Hop theatre piece telling the story of a young Chicano boy as he comes to understand his distant relationship with his father through a newfound love for Hip Hop. Told by a younger Gabriel, a quietly fierce renaissance child of the arts behind the wheels of his heavily coveted DJ set, and by his father behind the wheel of the car, the story touches on the dynamics of father/son relationships halted by divorce and what it means to use Hip Hop to overcome the fears of a broken family. “Wheelz” is a journey that incorporates Turntablism and Beatboxing to make powerful progress with the Latino Movement and Hip Hop Movement.

COMPUTATIONAL SIMULATION OF THE CRYSTALLIZATION PROCESS DURING ICE CREAM PRODUCTION

Margaret Debrauske, Shin Yee Wong (Mentor), Biological Systems
Engineering

The quality of ice cream depends largely on the size of the ice crystals that evolved during the freezing process. Past ice cream studies have focused on the science of the evolution of ice crystals, but because of the difficulty in retrieving the data experimentally due to the closed opaque freezer, there is a lack in the process correlation. Computational Fluid Dynamics (CFD) is used as a modeling tool to visualize fluid flow pattern and heat distribution. By analyzing the CFD output for different types of freezers, the correlation between ice crystallization events can be established. Then, improvements can be made to the freezer's design, which will eventually lead to better tasting ice cream.

INVESTIGATING TYPE II SECRETION COMPETITION BETWEEN POLYSACCHARIDE-DEGRADING ENZYMES

Mark DeCanio, Rembrandt Haft (Mentor), Wisconsin Bioenergy Initiative

Type II secretion systems are used by a diverse range of pathogenic Gram-negative bacteria to translocate proteins to extracellular environments. Type II secretion systems have evolved the capacity to secrete multiple proteins with high specificity, although details on this ability are largely unknown. The aim of my research is to quantify the secretory competitiveness of simultaneously expressed enzymes in order to elucidate both the capacity of type II secretion as well as a system's preference for individual substrate enzymes. Specifically, my experiments measure the change in secretion of polysaccharide-degrading enzymes when another secreted substrate is concurrently expressed. By comparing the change in secreted enzyme activity between several substrates, I can define a hierarchy of enzymes in regard to secretion competitiveness.

THE POWER OF COMMON INTEREST FOR MOTIVATING WRITERS: IMPLICATIONS FOR TUTORING PRACTICE

Natalie DeCheck, Amanda Godbee (Mentor), English

The writing process is a common source of trouble, whether we enjoy writing or avoid it. Writing centers provide support for writers to work through this trouble, in part, through motivating writers to keep writing and seek feedback on their work. Drawing on interviews with a writer and tutor about their ongoing relationship and work together, this qualitative study suggests a correlation between a tutors' interest and writers' motivation. Specifically, the writer reports increased motivation and interest in her research, and attributes these changes to the tutor's interest in her project. This case study offers a framework for describing motivation in writing conferences and brings attention to the need for psychological research on one-with-one writing talk.

GESTURAL DRIFT IN GREEK-ENGLISH BILINGUAL SPEAKERS' STOP CONSONANT PRODUCTIONS

Ekaterini Derdemezis, Eun Jong Kong (Mentor), Communicative Disorders

Gestural drift is a perceptually-guided change in speech production that has been observed in a few case studies of L2 speakers. It is defined as the influence of L1 on L2 productions, observed after longtime L2 adult speakers have been immersed in L1. We investigated acoustic evidence for gestural drift in Greek-English bilingual speakers' stop consonant productions. We hypothesized that the amount of gestural drift would vary according to speakers' language experience and word type. Eight speakers with varying bilingual experience read lists of real words and nonwords in Greek before going ('before' condition) to Greece and upon their return ('after' condition). We measured voice onset time and amplitude of the target consonants. We predicted changes in both acoustic parameters between 'before' and 'after' conditions.

CELL LINES COMMONLY USED AS MODELS FOR INFLAMMATION CONTAIN VARIATION IN TOLL-LIKE RECEPTOR GENES

Jessica DeValk, De-Ann Pillers (Mentor), Pediatrics

Toll-like receptors are a family of transmembrane receptor proteins and serve as the first point of defense in the innate immune system. TLR4-D299G, TLR4-T399I, TLR2-P631H, TLR2-R753Q and TLR1-N248S single nucleotide polymorphisms are associated with a decrease in innate immune response. We sought to determine the presence of common TLR SNPs associated with inflammation in a cohort of cell lines used for inflammation studies. DNA was isolated from the following cell lines: HUVEC, HEK293, A549, HRPE, HeLa, Jurkat, MCF-7, A431, and Y79. TLR4-D299G, TLR4-T399I and TLR2-P631H SNPs showed heterozygosity for WT and NV alleles in HeLa cells and other cell lines were homozygous for WT alleles. HeLa and HEK293 lines were homozygous for WT allele TLR1-N248S SNP and other cell lines were homozygous for NV allele.

THE EYES HAVE IT: VISUAL INTERACTIONS IN THE BUDDHA BIOGRAPHY

Andrew Dibble, Gudrun Buhnemann (Mentor),
Languages and Cultures of Asia

This presentation discusses two visual interactions in the Buddhacarita, the first century biography of the Buddha by the Buddhist saint Asvaghosa. The first of these interactions is samvega, the feeling of shock experienced when one encounters old age, disease, or death and thereby obtains insight into the fundamental nature of suffering in the world. The second interaction is darsan, reciprocal 'seeing' between deity and devotee or teacher and student. A new model of salvation in Buddhism will be proposed for those who have had the mixed blessing of being initiated to Buddhism via samvega. Knowledge of the Buddha's biography is not assumed.

AURORA: DIVERTIMENTO FOR SOLO VIBRAPHONE

Joseph Diedrich, Stephen Dembski (Mentor), Music

The basis of this project is to compose a piece of music of approximately eight minutes to be played by a soloist on a vibraphone. The piece is written in five separate movements, each relating in its own way to the overall programmatic theme: the astronomical phenomenon known as an “aurora.” Among the various compositional techniques and harmonic structures to be utilized include tonal harmony, modal scales, synthetic scales, bitonality, mirror writing, isorhythm, and isomelos, among others. The goal of the compositional process is to become familiar with and effectively communicate complex compositional structures and musical ideas in an interesting, audience-pleasing, and playable manner. The piece will be written with the intent of a live performance at the symposium.

MOBILE HEALTH INITIATIVE IN RURAL KENYA: MOSQUITO NET DISTRIBUTION PROJECT

SarahMaria Donohue, Megan Kleber, Araceli Alonso (Mentor),
Gender and Women’s Studies

One of the major public health concerns and leading cause of morbidity and mortality in Kenya is malaria. This project identifies the need for preventative anti-malarial mosquito nets in the communities of Lunga Lunga, Godo, and Perani, located in rural southeastern Kenya. Through months of cultural immersion and community-based research this project was able to identify a target population based on elevated rates of malarial infection; post-menopausal women. Principal to this initiative is the goal of increasing local knowledge in regards to preventative anti-malarial mosquito nets and the proper technique in which to assemble and suspend them. Therefore, health literacy is the central focus and is addressed through the Mobile Health Initiative, which provides community-wide sessions on disease prevention and treatment.

ADAPTATION TO VOCODED SPEECH IN CHILDREN AND ADULTS

Garrison Draves, Matthew Goupell (Mentor), Waisman Center

Cochlear implants (CIs) partially restore hearing for those with hearing loss caused by damage or deterioration of the inner ear. Through a noise vocoder, it is possible to simulate information provided to a CI user in normal-hearing (NH) individuals. The goal of this research is to study learning effects in NH children and adults listening to vocoded speech. We measured vocoded speech understanding over several hours where the listeners received correct answer feedback. We hypothesized that vocoded speech understanding scores would differ between children and adults. The speech materials were sentences and single-syllable words, presented in quiet or with background talkers. Results show that children learn vocoded speech at a faster rate with both words and sentences, while adults maintained an overall better performance.

LATINO LAY HEALTH ADVISORS: A MIXED METHODS STUDY ON THEIR ROLE AS HEALTH PROMOTION AGENTS

Janel Draxler, Norma Magallanes, Lina Vera Cala, Ana Martinez-Donate
(Mentor), Population Health Sciences

Lay health advisor (LHA) interventions are promising in addressing health issues among underserved populations. However, little systematic research has been done on LHAs' characteristics, motivations, and challenges. Qualitative and quantitative methods were combined to obtain information from fifteen LHAs who worked for Cuidándome, a program promoting breast and cervical cancer (BCC) screening among low-acculturated Latinas in Wisconsin. Preliminary results indicate that all LHAs who were foreign born (47% Mexican) preferred to speak only Spanish (67%). Their most frequently reported strength (80%) was the desire and ability to educate people. The most common challenge faced was scheduling issues (62%). LHAs strongly believed in the effectiveness of LHA approaches for health promotion. Results from this study will help improve the design of future LHA-based programs.

AUTOMATION OF IMAGE ANALYSIS FOR ARABIDOPSIS ROOTS AND HYPOCOTYLS

James Driver, Hesam Dashti, Amir Assadi (Mentor), Mathematics

Research on plant growth and development has an old and rich history of attempts to quantify observable traits, such as morphology and rate of growth of plant roots and shoots. Over 150 years ago, Darwin examined the dilemma of biological evolution in plants without the apparent presence of an animal-like nervous system. His insightful observations and prophecies were recorded in a number of books, the most celebrated among them, *The Power of Movement in Plants*. Several decades later, the discovery of a fundamental growth and control hormone Auxin revolutionized plant biology. In this project we report on some preliminary progress in bridging the gap between computational and systems biological methods for plants.

GENOTYPE-PHENOTYPE VARIATION IN RETINA VASCULATURE USING A QUANTITATIVE SYNTHESIS OF SYSTEMS BIOLOGY

James Driver, Hesam Dashti, Amir Assadi (Mentor), Mathematics

The genotype-phenotype relationship in retinas is notoriously difficult due to many intermediate layers controlling attributes in development and interactions within neurovascular systems. In this preliminary report, we discuss progress in the design of novel methods to quantify variations on retinal branch structures as they occur naturally, or due to perturbations, such as retinopathy. Ultimately, we aim to offer a software suite to provide biomedical researchers the opportunity to study different levels of detail in vasculature structures in retina images, and relate morphological variation to variation of dynamic patterns in molecular networks. Our objective is to endow sufficient accuracy and practicality to enable clinical applications, such as the ability to distinguish between healthy and diseased retinas through non-invasive imaging and common genomic-metabolomic data collected from patients.

BRAIN-DERIVED NEUROTROPIC FACTOR STIMULATES RAPID TRANSLATION OF SRC PROTEINS WITHIN GROWTH CONES

Allison Ducharme-Smith, Anna Drewry,
Timothy Gomez (Mentor), Neuroscience and Anatomy

During development, axons must navigate through the embryo to make proper connections with target neurons or tissues. Key to the process of axon pathfinding are nerve growth cones. Growth cones are sensory-motile structures located at the tip of the extending axons that activate intracellular signals in response to extracellular guidance cues. One crucial group of signaling molecules is the Src-family protein-tyrosine kinases (SFKs), which are involved in growth cone guidance. Our research using immunocytochemistry (ICC) has shown that the level of activated Src (P-Y418) increases in growth cones after a two-minute treatment with the neurostimulant Brain Derived Neurotrophic Factor (BDNF). Moreover, this effect has been shown to be protein-synthesis dependent since the translation inhibitors cyclohexamide (CHX) and anisomycin block the increase in Src.

IMPACTS AND THEORIES ON DEVELOPMENT AND INDIGENOUS PEOPLES

Vidaur Durazo, James Klausen (Mentor), Political Science

The following research venture attempts to uncover the consequences created by large-scale development projects on indigenous peoples in Asia and Latin America. Professor James Klausen leads the investigation with intention of utilizing the findings for future publications relating philosophy on ruler to subject relationships from theorists such as Rousseau and Foucault, to the context of indigenous peoples and their contact with governments in developing nations. These projects include rural electrification, logging and mining practices in India, Brazil and Ecuador. The diversity of sources, such as online scholarly databases and print outlets in English, Spanish and Portuguese, aim to represent the multiplicity of actors involved. Results indicate that these development undertakings lead to cultural alteration, geographical displacement and a high mortality rate among the indigenous people.

THE ART OF RESEARCHING

Hillary Durazo, John Hunt (Mentor), Forest Products Laboratory

Over the past five months research has been conducted to help minimize the amount of recyclable products that travel in our society's waste system. The purpose of this research was to analyze, test and develop a process that involved creating a material using by-products and recyclables, rather than raw material. With the guidance of John Hunt, research mechanical engineer and inspiration from Christine Lee, a University of Wisconsin artist-in-residence, research became an art form with the future goal of being a useful panel product. Sawdust and planer shavings left over from cherry, poplar, and maple wood trimmings and recycled newspaper trimmings were mixed and pressed to create nominally 3/4-inch thick boards. The idea of art and research to create an environmentally green and durable panel product that is made from readily available material offers a new insight into recycling. Chris Lee's art display, "By-Product's By Products" showcases the material is currently on display at the Madison's Children's Museum. Further detailed research to determine the potential strength, performance characteristics, and economics of this new panel product is still in progress.

EMPOWERMENT OF VOLUNTEERS IN ORGANIZATIONS

Anna Edelstein, Brian Christens (Mentor), Interdisciplinary Studies, School of Human Ecology

The purpose of this research is to identify different levels of empowerment in grassroots associations. Empowerment is an ongoing process where individuals, organizations, and communities can gain greater control, efficacy, and social justice. Grassroots associations are locally-based, independent, and volunteer-based non-profits that demonstrate advocacy by building public awareness around a cause. Organizational and individual surveys are distributed to the organizations if they meet the criteria of a grassroots association, and if a key leader agrees to participate. By looking at empowerment through grassroots associations, this research will show how such organizations display empowerment differently than traditional non-profit organizations. The research goal is to benefit communities through democratic participation and involvement with policies to generate future research on grassroots associations.

ISOLATION OF XENORHABDUS BOVENII INSERTION MUTANTS THAT ARE DEFECTIVE IN LIPASE ACTIVITY

Jessica Edward, Heidi Goodrich-Blair (Mentor), Bacteriology

Xenorhabdus bovienii is an insect pathogen and a beneficial symbiont of *Steinernema jolietii* nematodes. *X. bovienii* kills insects, and within the cadaver supports nematode reproduction, a process that is not well understood. A related species, *Xenorhabdus nematophila*, expresses lipase activity that contributes to *S. carpocapsae* nematode development. Therefore, we hypothesized that *X. bovienii* lipase activity plays a similar role in supporting *S. jolietii* development. To test this I am isolating *X. bovienii* insertion mutants that are defective in lipase production. By mapping the locations of the insertions I will identify genes involved in lipase activity. By measuring the effects of this mutation on the timing and number of progeny nematodes that develop I will determine if lipase activity is necessary for nematode reproduction.

COLLEGE STUDENTS' REACTIONS TO MENTAL HEALTH STATUS UPDATES ON FACEBOOK

Katie Egan, Megan Moreno (Mentor), Pediatrics

Focus groups of 34 college students were held to determine views on mental health references seen in Facebook status updates. Transcribed data was analyzed by four reviewers using an iterative process. Students' views of mental health statuses diverge from being either serious calls for help or need of support, to joking or seeking attention. Although participants anecdotally reported that females display more status updates than males, participants noted very few differences in how males and females display mental health status updates. Reactions to mental health status updates reflect offline relationships. Students would contact close friends through a phone call or in person conversation, but would not approach distant friends or acquaintances. Future research and interventions using Facebook should consider these views.

EFFECTS OF TRAUMATIC BRAIN INJURY ON HIPPOCAMPAL PLASTICITY

Nishikanta Elangbam, Craig Levenick (Mentor), Neurology

The main goal of our lab is to study how neural activity in the hippocampal region can be used to predict, prevent and treat the effects of traumatic brain injuries (TBI) by use of a rat model. Rats are delivered a TBI by a controlled cortical impact to fronto-parietal and temporo-parietal lobes. Video/EEG analysis is performed on the rats to observe for behavioral seizures. A combination of MRI imaging and histological analysis is used to correlate the effects of the location and severity of TBI to symptoms of post-traumatic epilepsy (PTE) and post-traumatic stress disorder (PTSD). The results found from our lab will be used to understanding and treating children and war veterans affected by PTE and PTSD.

PLAYING TOGETHER SEPARATELY: MAPPING OUT LITERACY AND SOCIAL SYNCHRONICITY

Jonathan Elmergreen, Gabriella Anton, Constance Squire (Mentor),
Curriculum and Instruction

There is a growing body of research on massively multiplayer online games (MMOs) or virtual worlds as literacy, yet much of the research to date is drawn along fairly simplistic distinctions between online and offline, virtual and real. Contemporary literacy research, however, suggests that neither time nor space are experienced in simple binary terms. In this paper, we use ethnographic data of gameplay in virtual worlds to reconceptualize MMOs as a literacy space and the act of gaming as traversal through that space. Using World of Warcraft, the most globally popular MMO to date, as our generative example, we detail the topology of the literacy space in terms of its constitutive texts and other semiotic resources by looking at type, function, and quality, highlighting degree of social synchronicity as one important dimension this metaphor foregrounds. With this conceptualization in place, we then describe gameplay as traversal of that space with the game itself acting as impetus rather than content.

EPILEPTOGENIC MECHANISMS AND TESTS OF POSSIBLE ANTI-EPILEPTOGENIC DRUG 2DG

Kathryn Eszes, Tai-Anna Rogers, Craig Levenick (Mentor), Neurology

Traumatic brain injury (TBI) is a leading cause of temporal lobe epilepsy (TLE). If drugs could be engineered to prevent the onset of TLE after TBI, this could improve the quality of life for many, and discovering the epileptogenic mechanism after TBI could hold insights for drug targets. TLE is induced in rats via controlled TBI followed with treatment with potential anti-epileptogenic, 2-deoxy-d-glucose (2DG). The rats are observed via video/EEG for the development of TLE. It is expected that the rats treated with 2DG will develop TLE more slowly/less severely than the control, as 2DG has been shown to be a neuroprotectant. MRI scans are taken of the rats' brains over time and neural lesion progression after TBI is monitored for potential epileptogenic mechanisms.

EFFECTS OF AGING ON SKELETAL MUSCLE OXIDATIVE METABOLISM IN RHESUS MONKEYS

Trent Evans, Rozalyn Anderson (Mentor), Medicine

Sarcopenia is the progressive decline in skeletal muscle mass and function that occurs with aging leading to disability and frailty. Little is known about how this decline occurs at the cellular and metabolic level. We performed histochemical analysis on muscle tissue from groups of young, middle aged, and old rhesus monkeys, the most representative animal model of human aging. Older monkeys showed impaired mitochondrial function reflected by decreased Cytochrome C oxidase activity and a consequent increase in lipid particle size indicative of reduced lipid metabolism. Observed nuclear delocalization of PGC-1A, a transcriptional coactivator governing mitochondrial metabolism, may be the cause of these age-related impairments. Elucidating these mechanisms provides cellular targets for future lifestyle and pharmacological interventions to prevent sarcopenia in humans.

TIRPITZ, THE SECOND NAVY LAW, AND THE FORCES BEHIND THE ANTI-BRITISH NAVALIZATION OF GERMAN POLITICS

Jeffrey Eversman, Jeremi Suri (Mentor), History

My project is an honors thesis for the history department focused on the development of the Imperial German Navy. Admiral Alfred von Tirpitz, State Secretary of the Navy, transformed the navy into a ‘political power factor’ which altered Anglo-German relations through two pivotal Fleet Laws in 1898 and 1900. He won support for the First Law, which created a modern defensive navy, organized to execute a single coherent strategy. The Second Law, however, transformed the fleet into an outwardly offensive and anti-British weapon. My thesis seeks to explain what combination of factors enabled Tirpitz and pro-naval enthusiasts to shift Parliamentary approval for a defensive navy into the offensive one that antagonized Britain and transformed European international affairs in the early 20th century.

HOME

Kayla Ewoldt, Sophia Flood (Mentor), Art

This piece signifies the importance of farmland and the connection that I have with it. The scene that is depicted is the backyard of the house that I grew up in. The looming city buildings in the background signify the fears that one day this open space will be gone and replaced with skyscrapers. I used soft pastels for this piece and it was successful towards achieving the look I was going for. It was also helpful towards making the cityscape very blurry and out of focus to draw attention to the farm scene. The final result of this drawing portrays the feelings that I have of this specific space and my concerns for the future.

ISOLATION OF JHAMT PROMOTER TO DEVELOP MORE EFFECTIVE PESTICIDE

Carie Fantl, Que Lan (Mentor), Entomology

In an effort to reduce the amount of mosquitos and their transmitted diseases, the JHAMT (juvenile hormone acid methyltransferase) promoter shall be isolated and cloned via polymerase chain reaction. The mentioned enzyme is vital for mosquito growth and development, and specific to insects. After successful isolation of this 300 kbp DNA strand, it shall be tampered with to achieve the long-term goal to ultimately discontinue JHAMT hormone production via negative feedback, and kill the mosquito with the newly developed pesticide.

MEDIA'S EFFECT ON TEEN'S SEXUAL BEHAVIOR AND OPINIONS TOWARD TEEN PARENTS

Joy Fatunbi, Megan Moreno (Mentor), Adolescent Medicine

More teens are becoming pregnant and more pregnant teens are appearing in the media. The purpose of this study is to see if media has an impact on adolescents' views on teen pregnancy and sexual behavior. Participants ages 14–20 took a survey that measured how exposure to teen pregnancy affects adolescents' perspective of teen pregnancy and sexual behavior. Among 30 surveys 50% were females. Among those who knew a teen parent, about twice as many thought it was acceptable. Among sexually active participants, 50% believed that teen pregnancy cannot happen to them. Findings suggest that most teens are exposed to teen pregnancy in media, which may be associated with beliefs that teen pregnancy is acceptable.

PREVENTING INJURY FROM AXON-DAMAGING DRUGS

Joy Fatunbi, Leonard Levin (Mentor), Ophthalmology and Visual Sciences

In many optic nerve diseases (e.g. glaucoma), the reactive oxygen species superoxide is necessary for the chain of events between axon damage and cell death. We want to know what triggers superoxide production when the axon is damaged and how to block its effects on the cell. We will study the effects of nocodazole and colchicine, which are known to cause specific types of axon damage, on neuronal RGC-5 cells. This will be carried out by treating differentiated RGC-5 cells with the drugs. We will then use other drugs that reverse the effects of superoxide, and see if we can prevent axon degeneration and cell death. Potentially, this research could lead to therapies for ophthalmic diseases where the initial injury is to the axon.

PERCEPTION OF PHONEME CATEGORIES IN MUSICIANS VS NON-MUSICIANS

Carly Faulhaber, Jan Edwards (Mentor), Communicative Disorders

Skilled musicians are better able than non-musicians to discriminate pitch differences in speech. However, studies have not examined whether other aspects of speech perception differ between musicians and non-musicians. We hypothesized that musicians would have more gradient perception of differences between two similar speech sounds, while non-musicians would sort these sounds into broader categories. To test this hypothesis, we used Visual Analog Scaling to evaluate the speech perception of musicians and non-musicians on two consonant-vowel continua (one was a sequence that gradually went from /t/ to /k/ and one gradually went from /s/ to /sh/). We are examining whether musicians made finer distinctions than non-musicians when classifying sounds that were intermediate between the end points of these continua.

FAMILY BUSINESS-OWNED SPORTS FRANCHISES

Dylan Ferro, Debra Holschuh-Houden (Mentor), Family Business Center

This project will attempt to analyze the success of sports franchises that are run by family-owned businesses. By dissecting the win totals and total revenue of family-owned franchises such as the Lakers, Yankees and Steelers, I will rate their success in comparison to franchises that have veered away from staying in the family. Also, I will examine how they make decisions and incorporate specific business tactics with their respective families in mind. I expect to find that their willingness to operate as a family, in turn leads to better performance, both statistically and monetarily.

FEEDING OUR NEEDS

Andrea Fiene, Thomas Berenz (Mentor), Art

Rural America makes up the vast majority of our nation's land. Often overlooked, it is vital to our survival and must constantly change to meet our growing needs. This contemporary landscape illustrates a feed mill in Mineral Point, Wisconsin. While it is located in a rural environment and seemingly "in the middle of nowhere," the mill is newly constructed with the latest technologies. The shiny surface and geometric lines of the mill contrast with its surrounding organic landscape. Over time, population will increase dramatically as farmland stays the same. Farmers will have to discover new ways to produce more food. Agricultural technologies must be constantly improving to become more efficient. Farmers cannot fall behind or else we will not have the food necessary for survival.

WRITING HERSTORY

Chelsea-Leigh Flucus, Susan Brantly (Mentor), Scandinavian Studies

Do women writers encounter any special issues when writing about women in the past? Professor Susan Brantly of the Scandinavian Studies department at UW–Madison has noticed five strategies Scandinavian woman authors use when discussing historical narratives from the female perspective. These strategies are that of exceptionalism, the litany of abuse, a history of women that exists in counterpoint to the history of men, locating a female utopia in the past and a postmodern historiographic metafiction. I am assisting Professor Brantly with examining the above methods and seeing if they are illustrated in British and American literature. We hope that our research can draw upon existing connections between both literary cultures.

PRE-STIMULATION OF EOSINOPHILS WITH IL3 AND TNF α DECREASES THRESHOLD FOR TSLP MEDIATED DEGRANULATION

Kristen Fox, Sameer Mathur (Mentor), Medicine

Several eosinophil functions contribute to the severity of asthma. Recently, the cytokine thymic stromal lymphopoietin (TSLP) has also been shown to be an important mediator in allergic inflammation. Our preliminary data demonstrated that high concentrations of TSLP (1 $\times 10^6$ g/mL) were needed for eosinophil degranulation. We sought to determine whether eosinophils could degranulate with lower, physiological concentrations of TSLP. We pre-stimulated eosinophils with IL-3 and TNF- α to mimic in vivo allergic inflammatory conditions and increase TSLPR expression. Upon pre-stimulation, eosinophil TSLPR mRNA expression increased 991-fold ($p < 0.001$) and surface receptor protein was detectable. The pre-stimulated eosinophils exhibited significant degranulation ($p = 0.05$) at a lower concentration of TSLP (50ng/mL) suggesting that physiologically relevant concentrations of TSLP can modulate eosinophil functions.

EVIDENCE FOR RIBOSOME BIOGENESIS DURING MECHANICAL LOAD-INDUCED GROWTH OF SKELETAL MUSCLE

John Frey, Troy Hornberger (Mentor), Comparative Biosciences

Skeletal muscle is the largest organ in the body and the maintenance of muscle mass plays a critical role in health and issues associated with the quality of life. Skeletal muscle mass is regulated by a balance between the rates of protein synthesis and protein degradation, and when the rate of synthesis exceeds degradation, skeletal muscle mass increases (hypertrophy). One possible mechanism that could promote an increase in the rate of protein synthesis, or hypertrophy, is an increase the number of ribosomes (component of cell that synthesizes proteins) otherwise known as ribosome biogenesis. In this study we show that significant ribosome biogenesis occurs during mechanical load-induced growth of skeletal muscles and we provide insight into some of the molecular mechanisms that regulate this event.

URBAN TAILS

Caitlin Furlong, Thomas Berenz (Mentor), Art

The objective of my drawing is to bring awareness to the growing population of feral cats living without a home in urban areas today. While it seems natural for stray cats to be seen in the city, their rapid growth rate is inevitably disrupting natural ecological balance. Additionally, these cats tend to live rough and unpleasant lives. The harshness of the city compared to the fragility of the cats should be apparent in this piece, shedding light onto the fact that such graceful creatures deserve a warm home.

INDUCTION OF PHENOLIC GLYCOSIDES FOLLOWING FOLIAR DAMAGE IN ASPEN ROOTS

Jake Fyfe, Kennedy Rubert (Mentor), Entomology

Populus species have a variety of ways to defend against insect and herbivore damage including phenolic glycosides which imparts bitter taste and toxicity. Phenolic glycosides (PG) production can be induced in roots following foliar damage in some *Populus* species. This study investigates whether production of the PGs salicortin and tremulacin may be induced in roots of *P. tremuloides* following simulated foliar herbivory. If observed, upregulation of PGs in roots of *P. tremuloides* would indicate a systemic response to foliar damage, and suggest that localized damage may lead to greater protection of the entire plant against subsequent pest damage. However, systemic upregulation of PG production would also divert energy from growth and may confer a competitive disadvantage when growth is important.

THE CIRCULATION OF PROVERBS IN SHAKESPEARE AND EARLY ENGLISH WRITING

William Garcia, Michael Witmore (Mentor), English

William Shakespeare is arguably the most influential writer in the English language. However, the source of his inspiration is a topic under debate. This project's purpose is to examine Elizabethan literature, compare it to Shakespeare's plays, and create a hypothesis that explains how the author was impacted by his contemporaries' works. We used both online and text resources to make spreadsheets that show points of correlation between Shakespeare's plays and other writings of the era. We then began to make a hypothesis explaining these relationships and how factors such as the writer, publisher, and year published influenced Shakespeare's work. Our results show a connection between Shakespeare and a prominent London publisher. In developing the hypothesis, we will continue to shed light on Shakespeare's creative process.

THE PATTERNS OF TOLL-LIKE RECEPTOR EXPRESSION IN VOCAL FOLD MUCOSA

Jessica Gardner, Zhen Davis (Mentor), Surgery

Dr. Nathan Welham and Dr. Zhen Davis, along with the other researchers of the Welham lab team have hypothesized that if the swelling after vocal fold injury can be controlled and minimized, scar tissue formation can also be controlled. Toll-like receptors (TLRs) recognize damage and pathogen-associated molecular patterns in order to regulate inflammatory signals during healing. Through this study, we sought to characterize the way in which TLR4 and TLR9 (two types of receptors) are expressed in damaged and healthy rat vocal folds. A previous study done in the Welham lab indicated that both TLR4 and TLR9 increase in expression after injury. This being the case, additional research is now being done to study the response of these receptors to danger signals.

LEARNING THROUGH PLAY

Carolyn Gasiorowski, Cynthia Kuhrasch (Mentor), Kinesiology

The goal of this research is to connect the skills of learning and play in order to develop methods through which learning can occur during play activities. With my mentor, Cynthia Kuhrasch, I have investigated published continuums of both learning and play in order to find characteristics of each that have therefore been used to develop my own continuum in research. Preliminary research shows that connections do indeed exist between learning and play, and that specific types of games or play activities are better matched in learning certain skills. We have additionally found that learning in this manner can occur on physical, social and cognitive levels. Our hope is to develop new styles of teaching that can be employed in the future.

THE DYNAMICS OF COLLAGEN FIBER DENSITIES IN RELATION TO SEVERE ASTHMA

Haley Goldsmith, James Hocker, Eric Wien, Paul Campagnola (Mentor),
Biomedical Engineering/Medical Physics

The overarching goal of the Campagnola Laboratory is to understand cell interactions with the extracellular matrix and how these change in diseased states. Specifically, we are imaging tissues from asthma patients of varying ages over cases of varying severity. Our Second Harmonic Generation imaging technologies allow us to view collagen fibers in great detail, as well as determine their respective densities. Our preliminary data shows large differences in the collagen structure in normal and patients with severe asthma. These measurements afford making correlations between collagen fiber densities and disease severity. By determining key properties that inhibit proper airway function, we can diagnose and treat asthma more efficiently. These same principles and technologies will also be applied to imaging models of breast and ovarian cancer.

STROKE PLASTICITY

Xavier Gomez, Mary Meyerand (Mentor), Medical Physics

The purpose of this research project is to investigate neural plasticity, the concept that neural circuits can be altered over time, in the brain after a stroke. A stroke is an interruption of the blood supply to any part of the brain that results in patients having brain damage. Studies have shown that patients who have suffered a stroke show different levels of neural reorganization. This study uses fMRI (functional magnetic resonance imaging) to investigate neural plasticity after strokes. Functional imaging will be collected while patients and normal controls perform various cognitive tasks. In addition, behavioral tests will be administered to identify how the brain plasticity affects cognition. The results of this research will help stroke patients during the recovery process.

MEDIA'S AND PARENT'S INFLUENCE ON ADOLESCENT NUTRITIONAL HABITS

Natalie Goniu, Megan Moreno (Mentor), Pediatrics

Increasing obesity rates among adolescents highlight the importance of identifying their nutritional influences. The purpose of this study was to explore parents' and the media's influence on adolescents' nutritional habits. Adolescents and their parents completed a survey describing their eating habits. Dietary choices were coded into categories ranging from unhealthy to healthy. In total, 46 surveys were completed. Among adults, 41.18% had healthy diets, 41.18% moderately healthy, and 17.65% unhealthy. Among adolescents, only 3.45% had healthy diets, while 55.17% were moderately healthy, and 41.48% were unhealthy. Approximately half (53%) of adolescents' diets were most influenced by their parents; among the others, 67% reported significant influence from the media. No clear link was found connecting adolescents' sub-par eating habits to their parents' or the media.

MODIFYING NANOTOPOGRAPHIES OF POLYMERIC SUBSTRATES UTILIZING DIFFERENT PLASMAS

Jordan Gosney, Sorin Manolache (Mentor), Engineering Physics

Many items we cannot afford to get wet because either they are expensive or contain vital information. These items could benefit from having a case that has super hydrophobic properties. A cheap way to produce materials with these properties is to alter the surface of a substrate such as a polymer coated surface with a plasma. My research involved comparing the effects of combinations of different plasmas on the same type of substrate. In my experiments, I used plasmas of Argon and Hydrazine and tested various parameters of pressure (mTorr) and plasma energy (watts). Half of the samples were given a treatment of Hydrazine plasma, all at the same pressure and power. Then, all of the samples received a treating of Argon plasma, varying pressure and power for each sample. At this time, I have no results to report but all experiments have been carried out and all that remains to do is to process the data.

DIFFERENTIATE: EXTERNAL SKELETONS AND INTERNALIZED OPPRESSION

Chanel Govreau, Ahna Skop (Mentor), Genetics

Differentiate is a cross-departmental project combining research in the Art Department, Genetics and Biotechnology and Asian American Studies. In the Skop lab I explore the external skeleton of the nematode worm, *C. Elegans* as a conceptual parallel for how humans use physical differences to create and protect self-identity. Using the critical lens of ethnic studies and Asian American identity development, I challenge how these constructions can also limit our potential and induce harmful internalized oppressions. I have synthesized this research into a visual arts practice by creating my own exoskeleton of sculptural costuming and fabric prints to explore how myself as a mixed-race, Asian American woman, like *C. Elegans* worms, can shed my physical limitations to fight internalized oppression and create the potential for transformation.

THE MOMAGER: WHEN THE MOTHER OF A CELEBRITY TAKES ON THE ROLE OF THE MANAGER

Justin Grabell, Debra Holschuh-Houden (Mentor), Family Business Center

My project will expose the positive and negative effects of managing one's own famous child. I plan to do so by looking into two different and famous "momagers," in Hollywood: Dina Lohan and Kris Kardashian. A momager is a famous teen's manager who is also their mother. In order to make my judgments, my research will include independent interviews and surveys. I am going to highly value public opinion of these women by interviewing people and taking anonymous surveys. I will apply what I learn about family businesses to further understand why and how some momagers lead to great success, while others, too often, bring the family and business to its demise. I also am going to focus on successor preparation and how well the celebrity manages his/her own career in adulthood.

GENEVA

Hannah Green, Thomas Berenz (Mentor), Art

My hometown, Lake Geneva, is slowly becoming commercialized just as is much of America. In a society that is constantly worried about the newest and latest technologies, buildings such as this one are rare. This particular theater is one of the few remaining historical buildings that's still used for its initial purpose. Many others have been either destroyed, converted, or simply forgotten. I appreciate that a historical place like this Geneva theater is still being used. I didn't choose this building purely for its contemporary use. This building is close to my heart because of the countless memories that have taken place there. I want to show respect for a timeless building that continues to touch the lives of individuals after a hundred years.

A ROSE BY ANY OTHER NUMBER

Jessica Greene, Jon McKenzie (Mentor), English

In my project, I have aimed to explain the concepts of numeracy, dataveilance, and the algo-numeric double through a story that contains aesthetic and narrative conventions of film noir. The title of my comic as well as the choice to have traces of red throughout the piece is a play upon Shakespeare's famous line, "A rose by any other name would smell as sweet." My work explores this quote, or more specifically, whether or not being defined by a number and associations with one's name affects identity in the modern world. While Shakespeare asserts that only being, not name, matters, I suggest in that name and number are greatly significant in that they are intrinsically linked to, and influence being.

BRAIN TUMOR-RELATED IMPAIRMENT OF COGNITIVE FUNCTION: A NEURORADIOLOGICAL ASSESSMENT OF PATHOLOGY

Max Greenstein, Vivek Prabhakaran (Mentor), Radiology

Diminished language and motor skills are commonly observed in patients afflicted with brain tumors. Yet, the pathology of cognitive impairments caused by brain tumors is not well understood. Our objective is to elucidate whether the tumor proximity to various white matter tracts in the brain plays a role in increasing the severity of impairments. Patients with brain tumors (n=32) received MRI scans and participated in a behavioral test to appraise each subject for the presence of cognitive impairments. Using computer software, we measured the shortest distance between each patient's tumor periphery and five particular white matter tracts. Three tumor-to-tract distances demonstrated significance. Conclusions: Language and motor deficits may be related to lesion proximity to specific white matter tracts.

{ CONFOUNDING VARIABLE }

Robert Gryzynger, William Brown (Mentor), Communication Arts

{ Confounding Variable } is a single channel video that explores long-forgotten transgression and the fallibility of one's own recollections. Making use of multiple video layers and time distention editing, the video calls into question the validity of one's memory. In doing so, the video resituates the memory as a site of uncertainty and self-interrogation.

PIROUETTE ON THE PRECIPICE

Robert Gryzynger, Rosemary Bodolay (Mentor), Art

Pirouette on the Precipice is a single channel video that confronts humanity's power to destroy and its uncanny ability to be complacent and complicit with its own destruction. The video aims to inspire viewers to break the pattern of complacency and complicity by acknowledging the pernicious behaviors that all too often engulf us. Only when we rebel against the prevailing attitude of apathy can we alter self-destructive cycles.

FUNCTIONAL DIFFERENCES BETWEEN THE YEAST HSP70 MOLECULAR CHAPERONES SSB1 AND SSB2

Lucas Gu, Amy Prunuske (Mentor), Biochemistry

Protein folding is a complex process that is mediated in the cell by molecular chaperones. Errors in protein folding can lead to aggregation of misfolded proteins, causing diseases such as Alzheimer's disease. One of the major chaperones in fungi involved in the folding of nascent polypeptides is the Hsp70 protein Ssb. There are two Ssb homologs in yeast, Ssb1 and Ssb2. Ssb1 and Ssb2 differ by only four amino acids. To test whether the differences in amino acid sequences are important to the function of the chaperones, we created and tested constructs to determine whether differences in strains lacking Ssb1 or Ssb2 were due to differences in the coding sequence or in the promoter sequence of the genes.

A POLICY ANALYSIS OF RANKINGS IN HIGHER EDUCATION

Zhoujie Guo, Kristopher Olds (Mentor), Geography

Educational rankings agencies gather all of the determinants that serve as significant information to the internal and external governing bodies of a university. These agencies have essentially become the middlemen of the education industry because they are the intermediary between the producers of education, which are universities, and the consumers, which encompasses governments, businesses and students. As a result of this relationship, rankings agencies now hold an unprecedented amount of power over higher education. Universities are beginning to cater to the wants and needs of these agencies because they affect how schools are being perceived by consumers. Therefore, considering the emerging clout that these mediums hold over institutions of higher learning, a policy decision regarding the governance of such organizations must be made.

TREATMENT OF CHALLENGING BEHAVIOR BY PARENTS OF CHILDREN WITH DEVELOPMENTAL DISABILITIES

Claudia Gupta, Wendy Machalicek (Mentor),
Rehabilitation Psychology and Special Education

Past research has shown that performance feedback has improved the manner in which parents interact with children with developmental disabilities who engage in challenging behaviors. In this study, video conferencing was used to assess the communication reasons for the child's challenging behavior (i.e., observations of each child's behavior was recorded and analyzed in correlation to the social conditions of demand, attention, tangible, and play). Each child's parent was then educated via videoconferencing in individualized behavior support strategies, which were observed to reduce challenging behavior in the child and create overall improvement in functioning together in daily life.

SSX2 PROTEIN IN PROSTATE CANCER IMMUNOLOGY

Reyna Guzman, Douglas McNeel (Mentor), Medicine

Reducing the spread of cancer in the body is an important part in fighting prostate cancer, the second deadliest cancer among American men. The SSX2 protein, expressed by some prostate cancer cells, is being researched to see if it is contributing to the growth rate of the cancer. My role in this research has been to conduct a variety of tests to evaluate the expression of the SSX2 gene in prostate cancer. Normal prostate epithelial cells are transfected with virus containing SSX2; then Western Blots are being run to see if the SSX2 protein is present. If SSX2 causes more proliferation and faster growing cancer, scientists could use the protein as a vaccine target to help the body respond more effectively against these tumor antigens.

**IRON RELEASE FROM SMECTITE ASSOCIATED
WITH THE MICROBIAL SIDEROPHORE
DEFERRIOXAMINE-B (DFOB+)**

Kathleen Hall, Rachel Moss, William Bleam (Mentor), Soil Science

Iron is a micronutrient essential to the survival of all plants and microorganisms, however, an inadequate amount exists in a bioavailable form in soil since it occurs primarily as insoluble minerals. To overcome this deficiency many bacteria exude siderophores, organic chelating agents that form soluble complexes with iron. We are investigating iron release by the siderophore DFOB+ from an iron-rich smectite clay mineral. Smectite clays are layer silicates belonging to the mica family. Iron-rich smectites contain iron within their crystalline layers, which we hypothesize limits DFOB+ access to the edge of the clay layers. The iron release rate is proportional to the amount of DFOB+ adsorbed to the clay, not simply the DFOB+ concentration in solution, consistent with a ligand-promoted model of mineral dissolution.

**ASSESSMENT AND TREATMENT OF CHALLENGING
BEHAVIOR BY PARENTS OF CHILDREN WITH AUTISM
VIA DESKTOP VIDEOCONFERENCING**

Rotem Halmann, Wendy Machalicek (Mentor),
Rehabilitation Psychology and Special Education

This study explored the use of video tele-conferencing (VTC) as a tool to provide feedback to parents of children with developmental disabilities and challenging behavior. The use of VTC may be especially beneficial for parents who reside in rural communities or areas lacking access to behavior specialists. Through VTC three parents were coached, received immediate performance feedback, and worked with the researcher to create an individualized function-based behavior support plan, which contained a treatment comparison that enabled an evaluation of the effects of the specific strategies on challenging behavior. Following instructional feedback via VTC, parents implemented the treatment and it was found that the challenging behavior of each child decreased.

TROUVAILLE: CLASSIC HORROR FILM INSPIRES CONTEMPORARY DANCE

Haley Halverson, Li Chiao-Ping (Mentor), Dance

“Trouvaille,” a contemporary dance for five women, explores filmmaker Alfred Hitchcock’s use of women and voyeurism in his work. I used Hitchcock’s films, specifically “Vertigo” and “Rear Window,” along with research about film theory to lay the ground for my creative research. The characters I coached the dancers to perform echo the roles of women in Hitchcock films. The women are aristocratic, poised, and beautiful making them improbable and unsuspecting victims. I use a soloist to depict a woman being terrorized and group work to sympathize and reinforce the principal victim, which is a relationship commonly seen between women in Hitchcock films. Through the use of movement, costuming, lighting, and music I experimented with and produced material that reflected my research.

MANIPULATING THE EPIGENOME AND GENE EXPRESSION TIED TO SECONDARY PRODUCTS IN ASPERGILLUS NIDULANS

Tiffany Han, Nancy Keller (Mentor), Medical Microbiology

Histone proteins help compact DNA and can be tagged with epigenetic marks that regulate gene expression. Some histone modifications, such as adding 2-Carbon groups (acetylation), can help open the DNA, allowing gene expression. GcnE is known to promote acetylation of histone3. In strains of *Aspergillus nidulans* engineered to overexpress gcnE, we hypothesize that expression of genes responsible for the production secondary metabolites (SM) will increase. It is also of interest to see if the overexpression of gcnE will remedy the loss of laeA, a global regulator necessary for SM production. By examining SM molecules from these strains on thin-layer chromatography, we can screen for novel or altered levels of SM products. With this, we will gain insight about regulation of secondary metabolism in this organism.

USING FMRI (FUNCTIONAL MAGNETIC RESONANCE IMAGING) TO LEARN ABOUT THE BRAIN

Nicole Hangsterfer, Mary Meyerand (Mentor),
Medical Physics and Biomedical Engineering

fMRI (functional magnetic resonance imaging) is a tool that scientists use to track brain activity when certain tasks, such as tapping a finger, are performed. Beth Meyerand's Lab uses fMRI to learn more about the structure and function of the brain. The main goal is to understand what functions different areas of the brain are responsible for. This information is important in understanding how different areas of the brain are connected with each other. The research done in Beth's is important for understanding and treating neurological diseases.

COPING IN OLDER INDIVIDUALS WITH MILD COGNITIVE IMPAIRMENT

Lori Hanna, Susan Heidrich (Mentor), Nursing

Mild Cognitive Impairment (MCI) is diagnosed when there is impairment in one or more domains of cognitive function, but the impairment is not severe enough to diagnose dementia. The purpose of this project was to (1) describe how older adults with MCI cope with their diagnosis and (2) examine relationships between coping and demographic and health information. Sixty three older adults with MCI completed 6 scales measuring coping behaviors to manage their MCI. Participants used many dementia prevention strategies and memory aids, some emotion-and problem-focused coping strategies, and very few dysfunctional coping strategies and supportive services. Findings will improve clinicians' understanding of coping patterns in patients with MCI and guide the development of nursing interventions to assist older persons with MCI and their families.

THE GENERATION AND SURVIVAL OF NEW GRANULE CELL NEURONS IN THE HIPPOCAMPUS OF THE ADULT RAT

Michael Hansen, Ronald Kalil (Mentor), Ophthalmology and Visual Sciences

In the adult rat, thousands of new cells are born daily in the subgranular zone (SGZ) of the dentate gyrus in the hippocampus. Most of these newly generated cells differentiate into neurons that populate the granule cell layer of the hippocampus, which lies immediately adjacent to the SGZ. While hippocampal neurogenesis has been the subject of intense study in the last 15 years, there are no systematically gathered data available in the rat regarding the onset and progression of neuronal differentiation by proliferating SGZ cells or the survival of the neurons that are generated. To shed light on these issues, we have used bromodeoxyuridine (BrdU) to label dividing SGZ cells and have stained SGZ cells that have divided for two markers expressed exclusively by neurons, NeuN and BIII-tubulin.

MEDIA INFLUENCE ON CHILDREN AND YOUNG ADULTS' PERCEPTIONS OF SCIENTISTS

KJ Hansmann, Sharon Dunwoody (Mentor),
Journalism and Mass Communication

The National Science Foundation recently reported women remain under-represented in science. Previous studies have indicated this gender gap may originate in middle school, when girls begin to report less interest in science and less self-confidence in their ability to participate in science. Researchers have theorized important links between media and individuals perceptions that help explain how girls may learn from the media that science is not for them. However, changing media representations of gender and science may be leading to more equitable perceptions among younger individuals. In this study, I am investigating what differences exist between middle school and college students perceptions of scientists. I predict that middle school students will be more likely to draw female scientists than college students pursuing a non-science major.

CHARACTERIZATION OF THE INTERACTIONS BETWEEN GLYCEROL AND PURINE/PYRIMIDINE DERIVATIVES

Zeeshan Haq, M Thomas Record Jr (Mentor), Biochemistry

Non-covalent interactions between the various functional groups on glycerol and the purine/pyrimidine derivatives in water have yet to be identified and quantified. The solubility of the nucleic acid bases and derivatives were measured in varying concentrations of glycerol and Setschenow constants were obtained. These were then analyzed via a least squares regression analysis to infer specific interactions between glycerol and different types of surfaces on the bases. Glycerol was found to have a favorable preferential interaction with sp2N, sp3N, and sp3C of DNA bases/analogues and an unfavorable preferential interaction with sp2C and sp2O. These observations reveal glycerol's ability to compete effectively with water to interact with various hydrocarbon and polar N groups on the various nucleic acid bases and derivatives thereof.

ROLE OF PROTEIN KINASE C DELTA IN THE INFLAMMATORY RESPONSE AND ANEURYSM FORMATION

Calvin Harberg, Stephanie Morgan (Mentor),
Cellular and Molecular Pathology

Abdominal Aortic Aneurysm is a progressive ballooning of the arterial wall characterized physiologically by extra cellular matrix degradation, smooth muscle cell depletion, and inflammation. With no therapeutic strategies and poor screening techniques available, this vascular disease remains highly lethal. Previously, our lab showed Protein Kinase C delta (PKCdelta), a member of the novel subfamily of the PKCs, to be a key component of aneurysm formation through the regulation of apoptosis and inflammation. Specifically, our results indicate aneurysmal inflammation to be mediated by monocyte chemoattractant protein 1 (MCP-1) which, in turn, is regulated by PKCdelta. In this study, we explore the mechanism by which PKCdelta mediates MCP-1 expression, focusing on c-Jun N-terminal kinase. Our research suggests PKCdelta may be an important pharmacological target in aneurysm treatment.

ANCIENT CRITIQUES AND APOLOGIES FOR THE KOSHER LAWS

Ariela Haro von Mogel, Jordan Rosenblum (Mentor),
Hebrew and Semitic Studies

Some modern thinkers have proposed justifications of the kosher laws based on arguments of food safety, sanitation, and hygiene. In addition, there is a perception that these ancient and restrictive edicts are incompatible with certain modern food technologies. An analysis of literature on scholarly interpretations of the kosher laws revealed that, contrary to expectations, Orthodox and Conservative Jews are open and even accepting of modern technology, like the genetic modification of foods, while some of their more liberal counterparts tend to be more cautious. Health-related justifications for the kosher laws also provide little explanation for the overall pattern of regulations, and appear to be post-hoc hypotheses that distract from the religious and cultural origins of these rules. These modern perspectives can be revised through understanding the roots of the kosher laws.

JERSEY SHORE AND SEX

Ember Harr, Megan Moreno (Mentor), Pediatrics

Watching sexual content on TV may expedite adolescent sexual initiation, suggesting the importance of such programs for sexual socialization. The purpose of this study was to explore how viewing sex on reality shows, such as “Jersey Shore” (JS) shapes freshman’s views about casual sex today. A ten question online survey was taken by students attending a large university. Of the 59 students recruited, most had seen JS (73%). Most (75%) viewers felt negatively about how JS portrayed casual sex; 47% stated there was no connection between the show and reality. However, 27% said JS could be setting a new sexual standard. Although most freshmen don’t believe JS influences reality, results suggest that JS may be subconsciously impacting the perspectives of casual sex today.

STRUCTURAL CHARACTERIZATION OF A NOVEL BERGMAN-TYPE QUASICRYSTAL APPROXIMANT IN THE CA-CU-CD SYSTEM

Nicholas Harris, Daniel Fredrickson (Mentor), Chemistry

Quasicrystals represent a group of intermetallic solids whose periodicity breaks the crystallographic rule by showing classically forbidden forms of symmetry. Quasicrystalline approximants (ACs) are 3D-periodic phases with structural similarities to their corresponding quasicrystals. These similarities can be useful when drawing conclusions about bonding patterns in related quasicrystalline phases. A new AC has been found in the Ca-Cu-Cd ternary system with approximate composition $\text{Ca}_{27.7}\text{Cu}_{5.7}\text{Cd}_{67.7}$. This new phase crystallizes in the monoclinic space group $C2/m$ (121) with unit cell dimensions $a=22.677(6)$ Å, $b=15.603(8)$ Å, $c=16.208(6)$ Å, $\alpha=\gamma=90^\circ$, $\beta=104.48(5)^\circ$. Although structurally similar to the series of quasicrystalline approximants known as the Bergman phases, this phase contains novel polyhedral arrangements not seen before in this structure type. This new phase represents the first observed AC within the Ca-Cu-Cd system.

HABITABILITY OF EXOMOONS: DYNAMICAL EVOLUTION OF GAS GIANT-SATELLITE SYSTEMS DURING MIGRATION

Victoria Hartwick, Eric Wilcots (Mentor), Astronomy

Habitability of a rocky, earth-like satellite orbiting a gas giant in the habitable zone of a star depends not only on the presence of liquid water and any number of organic and inorganic molecules, but also on the stability of the satellite's orbit around the planet within a set of limited orbital elements. Satellites that formed with its gas giant must have also migrated inwards with the planet to the habitable zone. This migration has currently unknown effects on the orbital dynamics of the satellite system. Upon reaching the habitable zone the rocky moon may no longer exist within the specified parameters for orbital elements, may have been lost altogether sometime during the migration, or may have gained an additional partner with which it may have resonance. To better understand the effect of migration on a satellite system, we propose the construction of a computer model reproducing the simultaneous migration of a gas giant and satellite through the protoplanetary disk.

ADIPONECTIN PRODUCTION AND PROCESSING IN MOUSE ADIPOCYTES

Neha Hasan, Rozalyn Anderson (Mentor), Medicine

Adiponectin, an adipokine also known as AdipoQ, is secreted from adipocytes. This hormone has pleiotropic effects such as increasing insulin sensitivity, stimulating fatty acid oxidation and suppressing hepatic gluconeogenesis. AdipoQ can assemble distinct isoforms that differ in their ability to stimulate a response in peripheral tissues. It is unclear what determines the ratios of different forms of AdipoQ within adipocytes. In this study, AdipoQ was subcloned in the Halo tag vector to generate a labeled recombinant protein that could be expressed in adipocytes. The processing and export of the resulting Halo-tagged adiponectin was then observed in live cells using a pulse chase experiment. Understanding the multimerization process of adiponectin is important as it may pave the way to developing potential treatments for metabolic diseases.

SKATE PARK

Grant Hauser, Thomas Berenz (Mentor), Art

My idea for this drawing was to render a skate park, symbolizing my memories of skating at the local skate park. A few years ago when the skate park was filled with friends, and we would skate everyday. The idea of skating progressed so rapidly, and ignited my passion for visual arts through the styles and aesthetics of the concrete playground. The empty solitary park, viewed through a sublet fisheye, represents the recent dispersion of friends going separate ways after high school. The skate park may never be what it was, but it will always be a beginning to the creative lifestyle I try to live.

THE GENERATION OF MEN IS LIKE THAT OF LEAVES

Ashley Hearn, Sophia Flood (Mentor), Art

In depicting the contemporary landscape I chose to explore questions of history and permanence by juxtaposing Cowboy Stadium to the facade of the Parthenon. Built in 2009 to replace its predecessor Dallas Stadium, demolished in 2010, owner Jerry Jones sought to create a structure that exemplified state of the art technology and design. My composition seeks to illuminate the question posed by this logic—will devotion to constant improvement and augmentation obstruct the preservation of history? Additionally, I painted the Parthenon facade with acrylics onto a clear sheet of polyester for the aesthetic purpose of creating depth and for the figurative purpose of establishing a sense of hierarchy between the modern and ancient eras.

EPILEPSY RESEARCH

John Heffernon, Thomas Sutula (Mentor), Neurology

Epilepsy is a brain disorder involving repeated, spontaneous seizures. The major goal of epilepsy research here at Madison is to determine if genomic and magnetic resonance imaging methods can predict development of post-traumatic epilepsy (PTE) and post-traumatic stress disorder (PTSD) in kindling susceptible and kindling resistant rats. Also there is an attempt to therapeutically reduce PTE and PTSD after a traumatic brain injury (TBI) by treatment with 2DG, a glucose analog that is an anticonvulsant and modifies kindling progression. TBI is a major cause of disability for younger people, and has become a focus because of military and athletic injuries. The major ongoing work in the lab is video-EEG monitoring of rats that have experienced TBI. The video-EEG monitoring determines what rats develop PTE.

COMMUNICATION IN FAMILY BUSINESS

Robert Heintz, Debra Holschuh-Houden (Mentor), Family Business Center

This project is looking into misunderstanding and potential for conflict in family business and how they can be avoided with having constructive communication practices in place. Issues that can arise due to poor communication: one family member ends up being the dominate figure in the business, family ties prevent honest opinions from being expressed, family members assume they know how other family members are feeling or want. I am researching the use of: family meetings, creation of governance structure, use of facilitators and advisors, family constitution. All of these are ways of preventing misunderstanding and conflict by encouraging open discussion and communication in a structured environment.

INFECTION CONTROL IN THE UW HOSPITAL

Carolyn Hendricks, Nasia Safdar (Mentor), Infectious Disease

The spread of infection within health care centers is an ongoing issue in the health care field. Many times this is not due to a lack of policies, but rather failure of health care workers to comply with the policies. This research shows compliance with both the hand hygiene and personal protective equipment policies in the University of Wisconsin Hospital over time. The data shows how different campaigns for compliance and administrative rounding can affect the compliance rates of hospital staff. The data compiled for this research also indicates that compliance rates tend to vary between staff discipline and unit specialty. There is an overall trend of health care workers washing hands more after visiting a patient than before.

CHANGE IN GENDER ROLES FOR HMONG WOMEN DURING THE SECRET WAR

Rachel Her, Kevin Thao (Mentor), Family Medicine

The Hmong population is one of the newest populations to arrive in the United States, and more is being learned about this culture and its rich history. This increase in research is revealing more information about certain components of the Hmong culture, such as the topic of changing gender roles. This study will investigate the roles of Hmong women before and during the Laotian Secret War through a literature review and several qualitative interviews with Hmong women. Issues explored will be the division of household duties, economic duties, and courtship/marriage duties, which changed due to the war. This analysis will help discover the influence of Hmong women in the family and social structures and inform intervention programs that promote healthy dietary options for the Hmong population.

WIS-CONFIDENTIAL

Kaitlyn Hermsen, Natalie Conant, Alex Stellhorn, Shelby Lewis,
Erica Halverson (Mentor), Curriculum and Instruction

Wis-confidential is a serious look at the world through the eyes of high school and college students. We explore the difficulties faced by young people as they go through an “identity crisis” while growing up through our own personal stories. Organized in a “This American Life,” radio show style, our piece is separated into four different chapters, one for each team member. In our stories, we give true accounts of “things we don’t talk about,” or things we tend to keep secret. We discuss what we keep hidden and why, as well as the memories that are most sacred or most influential to us.

THE UNITED STATES’ INTERNATIONAL TAX POLICY: COMPLEXITY DUE TO BALANCE

Jacob Heyka, Allison Christians (Mentor), Law

This article details the reasoning behind the United States’ complicated international tax policy. Through analysis of influential tax reforms in the United States’ history, we learn that each tax policy is created while struggling for balance between two things; what best suits the national economy, and what best suits the United States’ pursuit to maintain a strong standing in the global economy.

READING INSTRUCTION IN SECONDARY ALTERNATIVE SCHOOLS

Mia Hicks, Terence Cunningham, Kimber Wilkerson (Mentor),
Rehabilitation Psychology and Special Education

The purpose of this project is to learn about alternative schools and programs in the state of Wisconsin and to determine if those schools and programs provide supplemental reading instruction for their students. First, we research all alternative schools/programs in the state, collecting descriptive data in an excel file. The data includes school contact info, WKCE scores from the language arts portion of the test, and disability statistics. Second, we are making phone calls to each school/program to gain certain information using a phone protocol. We intend to take this research and use it towards improving instruction in alternative schools/programs particularly to improve reading instruction and levels.

HANDING DOWN A BUSINESS TO THE NEXT GENERATION

Ty Hildebrandt, Debra Holschuh-Houden (Mentor), Family Business Center

I will attempt to determine how to best prepare a business for a successful transition from one generation to the next. I will research the different ways of handing down the business through books on the topic as well as interviews. I will analyze current businesses in how they have successfully changed ownership of a firm from one generation to the next including buying the business outright, forming a limited liability cooperation or by selling through stocks/bonds amongst others. With each type of selling, I will provide pros and cons in the areas of family, business and ownership. From the information gathered, I anticipate developing a detailed report that business owners can use when considering the best way to successfully change ownership of the business.

FOOD DEBATES ACROSS CULTURE AND TIME

Emily Hilts, Jordan Rosenblum (Mentor), Hebrew and Semitic Studies

Food conveys the identity of the people who consume it and is an integral part of their culture. As Americans attempt to alter eating habits for health, environmental, and ethical reasons, this phenomenon is often neglected. Because this lack of understanding of social context, proposed solutions to problems like obesity have not been widely adopted. To bring a comparative perspective to the modern food debate, this study investigates the arguments the Jewish people used to defend and explain kosher law throughout history. Comparisons are made between women of the 20th century, who solidified the eating habits of America today, and the Jewish women of the post-medieval period, who shaped unwritten kosher law. Other contrasts are examined as well, such as defenses of slaughtering methods.

VARIATION IN STRESS SENSITIVITY AND AQY2 EXPRESSION IN DIVERSE *S. CEREVISIAE* STRAINS

Jacob Hilzinger, Audrey Gasch (Mentor), Genetics

Evolutionary biologists have long sought to understand how the interactions between an organism and its environment affect its phenotypic evolution. By looking at phenotypic and genetic variation between populations, we can begin to elucidate the genetic mechanisms of local adaptation. By utilizing spot assays, qPCR, and sequencing, we explore phenotypic variation in environmental sensitivity, the expression variation of AQY2, a gene linked with freeze-thaw survival, and genotypic variation in AQY2 between diverse strains of yeast *Saccharomyces cerevisiae*. Our data shows a large amount of variation in phenotypes, transcript abundance, and genotypes between wild and domestic strains of yeast, suggesting possible cis- and trans-regulatory elements of AQY2 that regulate transcript abundance, and, in turn, possibly regulate the freeze-thaw phenotype.

TRACKING TODDLERS' EYE MOVEMENT AND ATTENTION TO VIDEO AND LIVE DEMONSTRATIONS

Luke Hinrichsen, Abbey Eckhoff, Jennifer Franke, Jacqueline Oswald,
Heather Kirkorian (Mentor), Human Development and Family Studies

Previous research concluded that toddlers learn better when taught via live demonstration rather than closed circuit television. In a replication of that study, special cameras are used to track where children look on the screen to determine how children's attention varies between the live and video conditions. Children watch a researcher hide a sticker behind one of four felt objects on a board. They then try to reveal the sticker when given the board. We are currently coding videos from this project to determine if visual attention changes how quickly toddlers find the sticker. The findings from this study might be used to create videos from which toddlers might be able to learn more easily.

HELPING INDIVIDUALS WITH DEVELOPMENTAL DISABILITIES BECOME MORE SELF-RELIANT IN THE KITCHEN

Beth Hoesly, Megan Cornell, Megan Hall, Marrie Norris,
Rachel Werts, Kimber Wilkerson (Mentor),
Rehabilitation Psychology and Special Education

The goal of this project is to increase independence of adults with developmental disabilities in Dane County. Lov-Dane, a non-profit organization committed to supporting adults with disabilities, is partnering with us to help encourage the young adults pursue independence by learning basic cooking skills. We have chosen this project as a way of giving back to the community by providing individuals with the skills necessary to cook healthy meals for themselves and feel a sense of comfort in their independent lives. Classes will introduce basic skills such as cutting with a knife, safety at a stove, maneuvering a cheese grater, and other useful techniques. At each class one of us observed and noted how the young adults progressed weekly and used this research to determine whether or not the individuals, in fact, became more independent.

DYE DESTRUCTION BY PHOTOELECTROCATALYTIC OXIDATION

Luke Holifield, Terence Barry (Mentor), Animal Sciences

Experiments were conducted to optimize the destruction of the dye AquaShade by a photoelectrocatalytic oxidation (PECO) device. PECO works when an ultraviolet light activates a photoactive catalyst to which a small electrical bias is applied. The effects of water salt concentration (chloride ions in water converted by PECO into chlorine which attacks the dye) and space-time (the amount of catalyst in the system) on the kinetics of dye removal were tested. Dye removal and chlorine were measured colorimetrically using a spectrophotometer. Increasing the chloride ion concentration and space-time both increased the rate of dye destruction by PECO. PECO shows promise as an energy efficient technology for removing chemical contaminants from water.

LIGHT JOURNAL

Rebecca Hovel, Sarah McDaniel (Mentor), Library

Light Journal is an experiment with exposure in both natural and composed environments. It explores the interaction of light with various materials, through the ambiguous and particular procedure that working with film entails. Captured with a Bolex camera in 16mm and constructed by hand-splicing the developed film, this work was made in 355 Intro to Media Production.

DEVELOPMENT OF A SITE-SPECIFIC PHOTO-CROSSLINKABLE U6 RNA FOR INVESTIGATING INTERACTIONS WITH PRP24

Samuel Huang, Samuel Butcher (Mentor), Biochemistry

The U6 small nuclear ribonucleoprotein (snRNP) particle is an essential component of the spliceosome, which removes introns and ligates flanking exons in precursor mRNA splicing. The U6 snRNP is composed of U6 small nuclear RNA (snRNA) and associated proteins. One such protein, Prp24, is proposed to chaperone U6 snRNA through the splicing cycle, mediating RNA conformational changes. However, the interactions of U6 snRNA and Prp24 are still unclear. In this study, we explored segmental ligation as a means of assembling U6 constructs containing 4-thio-uridine. We optimized the assembly of s54U6_30-95, a fragment of U6 snRNA consisting of nucleotides 30 to 95 with a 4-thio-uridine label at position 54. Under UV light, this construct can be crosslinked to Prp24, and the crosslink can be analyzed by mass spectrometry to assess the locality of the interaction with Prp24. Although we believe this could be a potentially useful approach to studying protein-RNA interactions, thus far, we have had limited success optimizing the crosslinking reaction.

DEVELOPMENT OF A HIGH-FREQUENCY PULSED LASER FOR FUSION RESEARCH ON THE MADISON SYMMETRIC TORUS

Noah Hurst, Wayne Harris (Mentor), Physics

In order to explore the feasibility of nuclear fusion as an energy source, it is important to understand plasma turbulence in the Madison Symmetric Torus (MST) fusion research device. A useful tool in characterizing turbulent phenomena in MST is the Thomson scattering diagnostic. High-power laser pulses are fired through the plasma volume and scattered off electrons, after which the scattered light is collected and local electron temperature is deduced. Turbulence studies necessitate high-repetition-rate measurements, for which a specialized laser system is currently being built and tested. This laser will offer pulses at a rate of up to 250 kHz, an improvement on the current 25 kHz system.

URBANIZATION IN CHINESE CITIES OF REGIONAL ECONOMIC IMPORTANCE

Conner Hutchins, Annemarie Schneider (Mentor),
Sustainability and Global Environment

Given the rate of urbanization over the last century—from 13% (1900) to an astounding 49% (2005)—it is becoming increasingly important for city officials to plan city growth to maximize efficiency while mitigating ecological damage. Using data collected from the academic literature on land use / land cover change (LUCC) in Chinese cities, we look to explain current urban rates and patterns of expansion in Central and Western China. By examining the data made available to researchers via Chinese governmental agencies, we assess the raw data necessary to draw our own conclusions and simultaneously understand Chinese scholars' analyses of LUCC in emerging Chinese megacities. Ultimately, this work will use statistical land use models to project future scenarios of LUCC, as well as environmental impact.

MCDONALD'S CLASSIC

Mandi Hutson, Sophia Flood (Mentor), Art

My concept for this drawing was based on an interest in the direction our country has taken in the last ten years. When I was younger, I learned to recognize the emphasis that was placed on being time-efficient, and no symbol represents our on-the-go lifestyle than the fast food restaurant, particularly McDonald's. As I get older, I see that America is taking a new direction. We still maintain our obsession with time-efficiency, however, our wallets are getting thinner and we cut back on things that aren't necessary. The abandoned-looking McDonald's in my drawing is a reflection of our choice to save money, and eliminate the things in our lives that are superfluous. Perhaps in the future we will see more McDonald's like this one.

ACTIVATION OF W BASED DIVERTORS WITH THIN RE AND MO COATINGS FOR FUSION APPLICATIONS

Amir Jaber, Douglass Henderson (Mentor), Engineering Physics

There is a great interest in low activation materials for fusion applications. Tungsten is used in plasma facing components of fusion power plants. Re and Mo are alloying elements of W that increase the integrity of the W alloy. Alternatively, Re and Mo can be deposited on the surface of W armors to enhance their dimension stability. Waste issues arise from the transmutation of Re and Mo. The waste disposal rating for the W-based ARIES-ACT divertor is examined. The results show that the Re coating must be fewer than 30 microns to be low-level waste (LLW). Mo coatings larger than a few microns exceed the LLW disposal limit. Mo-94, Mo-98, and Mo-100 transmutation contribute the most to the radioactivity of Mo activation. It is recommended that natural Mo be tailored to remove Mo-94, Mo-98, and Mo-100 isotopes and the Mo coating be less than 25 microns to meet the LLW disposal limit.

FUNCTION OF TRANSCRIPTION ELONGATION FACTOR NUSG IN SIGMA-DEPENDENT PAUSE SUPPRESSION IN E. COLI

Momodou Jammeh, Rachel Mooney (Mentor), Biochemistry

Bacterial transcription (messenger RNA synthesis) is initiated by a complex of sigma factor and RNA polymerase (RNAP) at a promoter. During elongation, sigma factor is not required and is released. However, if transcribing RNAP encounters a promoter-like sequence in the DNA, sigma factor can rebind RNAP and DNA. RNAP pauses and is temporarily unable to add nucleotides. NusG blocks sigma pausing, but does not affect initiation. My hypothesis is that the mRNA strand needs to be a certain length in order for NusG to interact with RNAP and inhibit sigma. Because there is no RNA when transcription starts, NusG is unable to act. To test this, I am looking at the ability of NusG to block sigma pausing when the RNA is different lengths.

THE SEARCH ENGINE PROJECT

Brian Janiak, Stephanie Edgerly (Mentor),
Journalism and Mass Communication

The Internet is a source of a vast amount of information. However, recent research has suggested that people are not taking advantage of the wealth of information available online. Instead they visit the same well-known sites for information or perform simple searches in Google (Hindman, 2009). Our study seeks to shed light on the conditions that prompt more thorough, or less thorough, information seeking behavior. Specifically, subjects will be asked to complete a pretest regarding their political preferences, as well as patterns of media exposure. Subjects will then be told that they are going to have a conversation with another student who either oppose, or support their view on same-sex marriage, as well as with someone who is undecided. Before the discussion, subjects will be given ten minutes to research their topic on the Internet. Their Internet traffic will be monitored and recorded. Ultimately, the data gathered throughout the study will shed light on the relationship between motivations that influence and how individuals search for information. Hindman, M (2009). *The myth of digital democracy*. New Jersey: Princeton University Press.

INVESTIGATION OF PAVEMENT TEXTURE PROPERTIES

Chris Jaworski, Timothy Miller (Mentor),
Civil and Environmental Engineering

Asphalt texture properties affect fuel economy, noise, friction, and skid resistance. These properties are critical for making highways and roads more sustainable. Several test methods can be used to measure surface texture properties. The circular track meter, dynamic friction tester, laser profilometer, British pendulum tester, and Kundt tube are several of these test methods. Preliminary results indicate that more porous asphalt absorbs more sound than dense asphalt. Friction data can be used to determine the International Friction Index, which can help describe the safety characteristics of the pavement. Laser profiling can be used to estimate the effect of surface texture on fuel economy. Further study is needed to validate and standardize these experimental test methods.

BUILDING NAZI GERMANY: PLACE, SPACE, ARCHITECTURE, AND IDEOLOGY

Matt Jenkins, Robert Ostergren (Mentor), Geography

With the help of Professor Joshua Hagen at Marshall University, Professor Robert C. Ostergren set out to complete a detailed analysis of the rise of Nazism through the lens of a geographer. What sets their work apart from that of others is the broad, geographical approach that has been taken. In the past, many other authors have focused on German and Nazi architecture, but none have given the topic the intense, geographical spotlight it deserves. The ultimate goal of the project is not to create an outline of the Nazi architecture, but rather a comprehensive and geographically nuanced treatment of the intriguing range of motivations, forms, styles, interrelations, and human experiences associated with the building of Nazi Germany during the 1930s and into the war years.

SAMURAI SUDOKU BASED SPACE-FILLING DESIGNS

Qiyi Jiang, Xu Xu, Zhiguang Qian (Mentor), Statistics

Samurai Sudoku is a popular puzzle that consists of five Sudoku grids with overlapping at the corner regions in the shape of a quincunx. The rule for this puzzle is in each 9×9 grids, digits from 1 to 9 need to be placed without duplicated numbers in every row, column, and 3×3 subsquare. By exploiting the structures of Samurai Sudoku squares, we propose algebraic methods to construct a new type of statistical design, called Samurai Sudoku based space-filling design, intended for combining information from different sources. The data from each source achieves attractive uniformity in low-dimensions. The constructed designs have many applications in biology, engineering and the social science.

THE EARLY BIRD GETS THE WORM: IMPORTANCE OF PRESERVING SCIENTIFIC COLLECTIONS

Karen Jilek, Carolyn Eaton (Mentor), Geology Museum,
Laura Halverson Monahan (Mentor), Zoology

The scientific collections at the UW Geology Museum (UWGM) and UW Zoological Museum (UWZM) contain more than 500,000 objects supporting a hefty breadth of research. The Waukesha Lagerstätte of the UWGM contains exceptionally rare fossils of extinct worms, leeches and other soft-bodied animals. The UWZM bird collection incorporates study skins, mounts, nests, and eggs and includes some of the University's oldest collected specimens. While the rehousing of specimens has been essential for both collections, the proper preparation of study skins at the UWZM and digital condition surveys at the UWGM are other components of collections preservation. Whether studying the evolutionary changes in prehistoric or more modern species, the proper storage and care of research collections is critical to ensuring their long-term availability for scientific research.

SELECTION BIAS ASSOCIATED WITH ADJUVANT THERAPY TREATMENT FOR PANCREAS ADENOCARCINOMA

Brittany Jilot, Clifford Cho (Mentor), Surgery

Pancreatic adenocarcinoma is one of the most deadly diseases with the only potential cure being surgery. Although receiving adjuvant therapy has shown to be beneficial, as many as one quarter of patients do not. A study was done using data from the University of Wisconsin hospital, and found that age greater than or equal to seventy years, distal pancreatectomy, absence of perineural invasion, and major complication were associated with a decreased likelihood of receiving adjuvant therapy. I hypothesized that similar factors would decrease the likelihood of receiving adjuvant therapy in patients throughout the United States. Chi-square univariate and multivariate analyses will be used to analyze patient characteristics. With this knowledge changes can be made to provide better treatment of pancreatic adenocarcinoma.

DNA REPLICATION FRIZZIE STYLE

Paul Johnson, Peggy Ludlow, Rebecca Stern, Katherine Stone,
Kerry Martin (Mentor), Zoology

We created this video tutorial for an honors biology course in order to aid introductory biology students. This video explores the intricate process of DNA replication, with emphasis on the steps of transcription. With the help of an insightful, enthusiastic teacher, Ms. Frizzie, the viewer gains a comprehensive understanding of the mechanisms of replication. This video was designed to simplify and animate the process of replication. DNA replication is often a difficult concept for students to grasp. Our goal in designing this tutorial is to clarify the steps of replication and the functions of the enzymes essential to this process.

CREATING HEALTH INFORMATION WITH KIDS

Alicia Johnson, Stephanie Bobeck, Lara Capangpangan, Kelly Horn,
Courtney Krueger, Evan Malsbury, Laura Mannino, Kathryn Michalski,
Courtney Roemer, Benjamin Ruyle, Zoe Schall, Brittany Sellers,
Tiffany Sheperd, Avery Spencer, Rabea Vanevenhoven-Shaheen,
Suzanne Vinohradsky, Yvette Egan (Mentor), Nursing

The project was designed to create age-appropriate health information for 4th and 5th grade students at the Allied Drive Community Center. The nursing students attended a Planned Parenthood training to understand adolescent physiological and psychological development and how to interact effectively with school-age youth. They researched important health information to share with the Allied students. Together, the nursing students worked to determine the Allied youth's prior knowledge and assumptions pertaining to puberty. The nursing students concluded that the best approach to communicate this information was to utilize interactive learning. The Allied youth contributed their opinions, drawings, and other information for the project. From this, the nursing students developed digitally narrated slideshows to present the information. Additionally, the nursing students provided study help in general subjects which further forged relationships.

GLOBAL WARNING

Grace Jolicoeur, Thomas Berenz (Mentor), Art

We experience the Earth as a beautiful phenomenon, with exciting miracles appearing in a cycle through time; flowers bloom, inspiring spring and snow glitters as it drifts into winter. The wind blows throughout emphasizing currents of movement as death provides for another life. The cycles are familiar and demonstrate balance. Contemporary society's innovations show that recent climate change is a sign of imbalance but does not fully comprehend that it is predominantly due to human disruption. Ignorance allows a feeling of victimization by a spontaneous Earth, when there is a cause behind every shift. As irregular weather continues, contemporary culture, capable of viewing the Earth as beautiful and complex, must choose to appreciate a swirling image, or respond to the warning of storms ahead.

NATURAL VARIATION: EARTH'S EXOSPHERIC HYDROGEN EMISSIONS AND GEOMAGNETIC ACTIVITY

Tiffany Jones, Susan Nossal (Mentor), Physics

Knowledge of natural variation is important to understanding global climate change. Hydrogen is a major component of the exosphere (~400+ kilometers altitude) and is a by-product of greenhouse gases, such as methane (CH₄). One influence on the upper atmosphere is the Earth's magnetic field that is affected by charged particles from the sun. The level of geomagnetic activity is measured via the Kp Index (data from the National Geophysical Data Center). The Wisconsin H-Alpha Mapper (WHAM) Fabry-Perot Interferometer observes emissions from hydrogen in the Earth's upper atmosphere. We have selected dates from the WHAM database that coincide with high or moderate geomagnetic activity and are investigating how hydrogen emission observations on dates of higher geomagnetic activity compare to those during quiet conditions.

WHY SOME TERRITORIAL PARTITIONS END CONFLICT WHILE OTHERS DO NOT: THE CASE OF ETHIOPIA AND ERITREA

Jiwon Jun, Nadav Shelef (Mentor), Political Science

This project asks why some territorial partitions seem to resolve nationalist conflicts while other partitions continue to cause violence. Looking specifically at Ethiopia and Eritrea's continuing territorial partition debate, we look at articles and journals written by Ethiopians and Eritreans within and outside the two countries, examine the different opinions about the territory division, and track how opinions of citizens and governmental organizations, especially the political parties, have changed and which ways they have shifted. Still in progress, the research about territorial conflict between Ethiopia and Eritrea is only one of the many territorial-divided countries we are researching. Through this research, we hope to see a pattern or trend to why some nationalist conflicts are resolved by territorial partitions while others are not.

UNIVERSITY HOUSEFELLOWS AND FACEBOOK

Lauren Kacvinsky, Megan Moreno (Mentor), Pediatrics

Housefellows can be important in helping freshman adjust to university life. Forty-one freshmen (51% male) were asked to rate how involved their housefellow is in their life and in the lives of other floor residents, with one being not involved and ten being extremely involved. The average for how involved the housefellow was in the resident's life was 4.9 (SD 2.4) and the average for how involved the housefellow was in other resident's lives was 6.1 (SD 2). Sixteen participants (39%) were Facebook friends with their housefellow. Focus groups with 22 housefellows illustrated that housefellows use Facebook to identify resident issues and address them in person. Housefellows are using Facebook in innovative ways that are consistent with their training.

RESTORING SOCIAL CAPITAL THROUGH MACRO AND MICRO SPATIAL DESIGN

Ashleigh Kahler, Mark Nelson (Mentor), Design Studies

The theory of social capital (per theorists such as Robert Putnam) suggests that improving the quality and quantity of social interaction could help solve many problems of modern society. For instance, it's possible that improving social interaction will also improve the state of the economy and environment. The hypothesis of this study is that there are ways to increase social interaction through spatial planning by increasing the amount of shared spaces and utilities at the macro and micro levels in areas experiencing urban sprawl (such as Los Angeles and Phoenix). To explore how design might affect opportunities for social interaction at the macro and micro level, I have designed a spatial plan for new and revamped cities at the city, neighborhood, and home level.

$N \rightarrow \Pi^*$ INTERACTIONS IN THE MOLECULES OF LIFE

Kimberli Kamer, Ronald Raines (Mentor), Chemistry and Biochemistry

Noncovalent interactions play a vital role in life processes. Many noncovalent interactions exhibit electron delocalization. For example, a hydrogen bond involves delocalization of a lone pair of a hydrogen bond acceptor over the antibonding orbital of a donor. Similarly an $n \rightarrow \pi^*$ interaction involves delocalization of an electron pair (n) of a donor group into the antibonding orbital (π^*) of a carbonyl acceptor group. This interaction has been shown to be present in most proteins. Our studies indicate that this interaction played an important role in life's origin by orchestrating the reactivity and stability of prebiotic molecules. Furthermore, we show that $n \rightarrow \pi^*$ interaction affects the chromophore maturation of green fluorescent protein, as well as the conformational, physical, and pharmacological attributes of Aspirin.

EPIGENETIC REGULATION OF GnRH GENE EXPRESSION ACROSS PUBERTY IN THE RHESUS MONKEY HYPOTHALAMUS

Jordan Kapke, Ei Terasawa-Grilley (Mentor), Pediatrics

Increased GnRH release is essential for puberty onset, however, mechanisms related to this increase are largely unknown. We hypothesized GnRH gene expression increases at puberty and that this increase is associated with decreased gene methylation. We measured GnRH mRNA by quantitative PCR and DNA methylation with next-generation bisulfite sequencing. We found GnRH mRNA increases and GnRH gene methylation levels decrease across the time of puberty in the male rhesus monkey medial basal hypothalamus. Additionally, we found strand asymmetries in DNA methylation, indicating regions of genomic activity that may be associated with the pubertal transition. Future studies will directly examine the role of DNA methylation in GnRH gene expression.

VEGETATIVE COVER IS IMPORTANT PARAMETER FOR MOUSE SPECIES DISTRIBUTION

Bretzman Kara, Janet Batzli (Mentor), Institute for Biology Education

Peromyscus maniculatus (deer mouse) and *Microtus pennsylvanicus* (meadow vole) are two common small mammals found in the Lakeshore Nature Preserve. *P. maniculatus* is known to be a vegetative generalist, whereas *M. pennsylvanicus* is exclusive to grasses and forbs. This study measured relative abundance of both mice species in habitats of varying vegetative ground cover (GC). Live traps were set in four areas; woods (low GC), grass field (high GC), garden (moderate GC) and prairie (high GC). With a total of 57 animals trapped over an eight-day period, *M. pennsylvanicus* had greater abundance in high GC, whereas *P. maniculatus* had significantly higher abundance in low to moderate GC. This study lends support for habitat differentiation among *M. pennsylvanicus* and *P. maniculatus* based on vegetative cover.

IDENTIFICATION OF NOVEL SUBSTRATES OF THE ER-BASED ACETYLATION MACHINERY

Anna Karst, Luigi Puglielli (Mentor), Medicine

Alzheimer's disease (AD), the most common form of dementia, is characterized by the abnormal aggregation of amyloid β peptide (A β) in the brain. BACE-1, the rate-limiting enzyme for the generation of A β , is regulated by lysine acetylation in the lumen of the ER. The ER membrane transporter AT-1, which translocates acetyl-CoA into the lumen of the ER, is essential for this process. AT-1 is also up-regulated in the brain of AD patients. Therefore, it is likely that mechanisms regulating lysine acetylation in the lumen of the ER are involved in the pathogenesis of AD. To better understand the role of AT-1, we are analyzing whether ER resident proteins undergo lysine acetylation. Identifying substrates of ER-based acetylation machinery will help us understand its broad biological functions.

NOVEL THERAPEUTIC TREATMENTS FOR ANGIOSARCOMA

Kelsey Kasmerchak, Kevin Kozak (Mentor), Human Oncology

The Angiopoietin-Tie2 system appears to be centrally involved in tumor angiogenesis; however, the therapeutic opportunities afforded by modulating Tie2 signaling are just now being explored in cancer patients. Inhibitors of Tie2 have just entered human trials and appear well tolerated with modest single agent activity. To maximize the potential of these agents, combined regimens that include Ang-Tie2 inhibitors and Vascular Endothelial Growth Factor receptor (VEGFR) inhibitors, merit attention. Murine models injected with SVR and MS1-VEGF cells are used as models of angiosarcoma to evaluate the effectiveness of this combined therapy. Ongoing studies include combination index analysis, in vivo tumor growth characterization, and single and dual drug applications in murine models to examine the effects of inhibitory drugs on the VEGF and Ang-Tie2 systems for potential clinic use in the treatment of cancer.

ELECTRON TEMPERATURE EVOLUTION THROUGH MAGNETIC RECONNECTION IN THE MADISON SYMMETRIC TORUS

Cale Kasten, Daniel Denhartog (Mentor), Physics

One proposed method to create commercial fusion energy involves heating ions of reactant particles in a magnetically confined plasma. Electrons are used to heat ions through collisions, so understanding how electron temperature evolves is important. Electron temperature evolution through magnetic reconnection events has been studied in the Madison Symmetric Torus reversed-field pinch plasma physics experiment. High energy lasers scatter light off plasma electrons and the resulting wavelength shift is spectral-analyzed to determine temperature. These measurements are correlated to an edge-localized magnetic fluctuation called a tearing mode. During reconnection, a temperature island forms near the edge of the plasma, and a core temperature structure forms with hot and cold regions. Core electron heat is lost during magnetic reconnection.

ECONOMIC IMPACT ASSESSMENT: BLESSING BASKET PROJECT, NYARIGA GHANA 2010

Brandon Kaster, Jeremy Foltz (Mentor),
Agricultural and Applied Economics

The Blessing Basket Project (BBP) works to reduce poverty in Northern Ghana by paying a “fair trade” style price for woven baskets. The economic impact assessment measured the changes in the lives of basket weavers participating in the BBP program during the five-year period 2004 to 2009. The study targeted three groups: participants in the program, non-participants in same village and unaffiliated residents in a neighboring village. Using a survey instrument, our team collected data on the changes in socioeconomic indicators for the three populations. We found that participating weavers realized substantial improvements to their standard of living beyond the control groups. On average, program weavers had a higher income, educated a larger percentage of their children, enjoyed more meals per day, purchased health insurance, and improved their homes with more frequency.

UNTITLED CONTEMPORARY LANDSCAPE

Jacob Kelley, Sophia Flood (Mentor), Art

I was interested in exploring the same type of problems ancient artists encountered. I did this by adopting a format that made use of registers, found within the art of many cultures. It was not my goal, however, to emulate any specific culture.

ECDYSONE HORMONE PRODUCTION IN YELLOW-FEVER MOSQUITOES

Stephanie Kent, Que Lan (Mentor), Entomology

We hope to identify the areas of mosquitoes that produce a developmental hormone called ecdysone. If the area of hormone production is identified, this could be used to create more efficient management methods for mosquito populations. We use polymerase chain reaction (PCR) to cut up and duplicate segments of mosquito DNA that are likely to contain the gene for ecdysone production. Once we isolate this gene, we will insert a gene that creates green protein. The modified DNA will then be injected back into mosquito zygotes, and the cells that produce ecdysone will also turn green, making them easily identifiable. We are still working on isolating the ecdysone gene. This research could help manage or eliminate the mosquito population, reducing the transmission of some diseases.

USE OF BLOOM'S TAXONOMY TO CLASSIFY TEMPORAL PROBLEM-SOLVING STRATEGIES OF TWO BIOLOGY STUDENTS

Michael Kerins, Janet Batzli (Mentor), Institute for Biology Education

According to Bloom's taxonomy, intellectual problem-solving development can be categorized as a series of cognitive abilities that start at low level skills, like factual recollection, and build to higher level skills, like synthesizing different viewpoints and generating a new hypothesis. Educators use Bloom's to design questions that elicit the desired level of cognitive skill. However, cognitive processes required to answer a question are often overlooked by evaluators or not expressed in the students' written responses, thereby losing key insight into students' thinking and learning. Utilizing video-recorded problem-solving think "aloud" protocols with two students, we describe development of a coding scheme for the use of Bloom's taxonomy to classify temporal cognition levels and patterns during student progression through biology problems.

HMONG HEALTH AWARENESS PROJECT CONCERNING BREAST AND CERVICAL CANCER

Pa Yiar Khang, Maichou Lor, Kao Feng Moua, Pa Xiong,
Shannon Sparks (Mentor), Human Ecology

Hmong Health Awareness Project is an awareness and educational workshop based on the Cuidandome model currently used by Planned Parenthood in the Madison Latino community. We hypothesize that the Cuidandome model will be an effective model in educating and providing information to the Hmong community. This study's purpose is to evaluate the effectiveness and feasibility of utilizing the adapted Cuidandome model in the Hmong community. A descriptive qualitative study was used at three community centers in Dane County. The evaluation included open-ended, post-workshop questions. Approximately 80 to 100 Hmong men and women have participated in the educational workshops and evaluation. Preliminary findings indicated the need for a more culturally effective evaluation tool.

TELEVISION PORTRAYLS OF ROMANTIC COURTSHIP: UNHEALTHY AND UNREALISTIC?

Lisa Kibiloski, Karyn Riddle (Mentor),
Journalism and Mass Communication

This content analysis will code the beginnings and initial interactions of romantic relationships on television shows popular among teenagers. The goal is to analyze how romantic relationships are portrayed, hypothesizing that during the courtship phase, the relationships are unhealthy yet suffer no consequences or overly romanticized and unrealistic. Based on media theories as well as previous studies and content analyses, it is clear that television affects how people view the world and potentially how they behave. It is important to first understand what viewers are taking in, before we can come to conclusions about how media is affecting them. Since content analyses that examine the types of messages television shows promote about romantic relationships are lacking, this study focuses on understanding what teenagers view.

TEMPERATURE CONTROL IN MICRO END MILLING

Ryan Kiecker, Frank Pfefferkorn (Mentor), Mechanical Engineering

The objective of this work is to control the temperature in the cutting zone during the micro end milling of polystyrene using a low temperature gas. Control of cutting temperature increases the speed and precision with which prototypes (e.g., microfluidic device) can be made. Low temperature air or nitrogen gas is blown across the upper part of the tool, lowering its temperature, and drawing heat away from the tip (i.e., cutting zone). The cutting forces, temperature of the tool, and surface finish of the workpiece is measured using a dynamometer, infrared camera, and white light interferometer, respectively. The results are expected to prove the concept and indicate the threshold temperature below which micro-cutting of polystyrene becomes effective.

PAIN MANAGEMENT AND PATIENT OUTCOMES AMONG HOSPITALIZED GERIATRIC PATIENTS

Bo Kim, Barbara Bowers (Mentor), Nursing

The purpose of this project was to examine the impact of use of opioids, non-opioids, and non-pharmacological therapies on pain management and patient outcomes for hospitalized geriatric patients. A secondary data-analysis was conducted examining medical charts and patients' self-report data from a quality improvement study. Patients who reported experiencing pain within the first 24 hours of hospitalization were recruited and their medical charts reviewed. Therapies and outcomes were obtained by patients' self-report. From the results, non-pharmacological therapies users reported significantly more pain relief than non-users. The use of non-opioids was associated with less time in the severe pain. Only half of patients used non-pharmacologic therapies, and the users received more pain relief. Nurses should consider incorporating the use of non-opioids and non-pharmacological therapies in their practice.

SPECTRAL DENSITY-SPATIAL RELEASE FROM MASKING IN BILATERAL COCHLEAR IMPLANTS

Courtney Klauck, Ruth Litovsky (Mentor), Communicative Disorders

Cochlear implants (CIs) are successful neural prostheses. CIs restore hearing functions in profoundly deaf individuals. CI users communicate successfully when no background sounds are present but struggle in acoustically crowded public settings. CIs can be implanted unilaterally or bilaterally. Unlike unilateral implantation, bilateral implantation should enable spatial sound perception, improving speech intelligibility in crowded acoustical environments. However, most bilateral CI users are unable to effectively use spatial information. This study examined the potency of spatial cues in speech simulating CI listening. Intelligibility of target speech within interfering speech was measured when speech quality parametrically varied across a range of spectral resolutions, and when both sources originated either from the same or different directions. Results showed the benefit of spatial cues increased with increasing spectral resolution.

PSYCHOSTIMULANTS ACT WITHIN THE PREFRONTAL CORTEX TO PROMOTE COGNITION: RELEVANCE TO ADHD

Raymond Klein, Craig Berridge (Mentor), Psychology

Psychostimulants, such as methylphenidate (Ritalin), are the most effective and commonly prescribed treatment for Attention Deficit Hyperactivity Disorder (ADHD). However, these drugs carry risk for abuse and toxicity, raising concerns about their widespread use. To better develop alternative treatments for ADHD, the neural mechanisms underlying the therapeutic actions of psychostimulants must first be understood. Previous neurochemical, electrophysiological and brain imaging studies suggest the prefrontal cortex (PFC) plays a critical role in the cognition-enhancing and behavioral-calming effects of these drugs. The current study examined the degree to which intra-PFC infusions of methylphenidate in rats enhanced PFC-dependent spatial working memory. Results obtained demonstrate that action of methylphenidate within the dorsomedial PFC, but not ventromedial PFC, is sufficient to promote PFC-dependent cognition.

AN INTERPRETATION OF FILM APPLIED TO DIGITALLY DESIGNED TEXTILES

Alex Kling, Jennifer Angus (Mentor), Design Studies

The films of several famous movie directors inspire my digitally designed textile patterns. For each director I have watched several of his or her films and taken notes on their style and any repetitive motifs appearing throughout the films. The first director I chose was Quentin Tarantino and I am going to tackle John Hughes next. I then create an inspiration board with images, sketches, and information to motivate the design process. From there I develop motifs that I feel capture the style and feel of the films. I have to keep in mind that the motifs will be put into a repeating pattern and try to envision where these textiles would be used; bedding, clothing, etc. For each director and set of films I am creating a collection of four different patterns using Adobe Photoshop and a textile industry software, Pointcarre.

FACEBOOK AS A COPING MECHANISM

Sara Klunk, Megan Moreno (Mentor), Pediatrics

Many adolescents post Facebook statuses about negative feelings, suggesting the use of Facebook as a coping mechanism. Forty university students ages 18–19 (52.5% female) were asked if/why they post negative status updates. Some did not so as to keep emotions private (25%) or because it brought unnecessary attention (20%). Some only posted positively (17.5%) or not at all (7.5%). Those that posted negative emotions responded that they did so to vent (17.5%), to be cheered up by friends/family (2.5%) or both (7.5%). Facebook is used to cope with negative emotions by 27.5% of students. This closely correlates to the 25.5% of adolescents that experience some kind of depression. The results suggest that Facebook may be used as a coping mechanism.

AND ONE FOR ALL

Ezra Knickelbine, Steven Horn, Cory Roseth, Erica Halverson
(Mentor), Curriculum and Instruction

And One For All is a radio piece which explores the concept of self-identity as perceived in the framework of a group. Using narrative and interviews, it tells three stories that view group identity in different ways—being a small part of something large, being a large part of something small, and dealing with having no group whatsoever.

THE POWER OF MATERIAL

Andrea Knowles, Thomas Berenz (Mentor), Art

Fashion greatly embraces the ideas of contemporary culture and is the epitome of modernity as it is ever-changing. The ideas of fashion, especially “high fashion,” are relentlessly striving to break ground, take risks, and create new trends. Fashion is iconic in our society and viewed as the ultimate instructions to looking and being as modern. This craze has led to increasing materialism in our society and is starting to develop among shockingly young age groups. Fashion monopolizes many aspects of consumer culture, and the model in this drawing represents this dominance fashion has over its followers. All eyes are on her; “What is she going to do next?” they ask. This same question arises as we attempt to follow the movement of fashion. However, the truth is, one can never keep up.

EFFECT OF LOBECTOMY WITH VIDEO-ASSISTED THORACIC SURGERY PROCEDURE DAY ON HOSPITAL LENGTH OF STAY

Sarah Kolonko, Anai Kothari (Mentor), Surgery

Minimizing patient hospital length of stay (LOS) is imperative due to the fact that prolonged LOS is correlated with nosocomial infection, increased healthcare costs, and decreased productivity. The goal of our study was to determine if the day of the week a lobectomy with video-assisted thoracic surgery (VATS) is performed affects a patient’s LOS. Our group studied 103 patients from a single institution using an IRB-approved thoracic outcomes database maintained contemporaneously. Patients who underwent lobectomy on Friday had a significantly longer mean LOS (4.4 days) compared to Monday (2.6 days), Wednesday (2.2 days), and Thursday (2.5 days, $P=0.004$). Further study will be done to examine why patients who have surgery on Friday are more likely to have a prolonged LOS.

INFLUENCE OF HUMIC ACID ON TWO TYPES OF TITANIUM DIOXIDE (TiO₂) NANOPARTICLES (NPs)

Michael Konrath, Sarah Yang (Mentor), Soil Science

TiO₂ NPs have a wide array of applications ranging from cosmetics to photovoltaics. Once released into the environment, dissolved organic matter is expected to affect NP toxicity. Toxicity is also expected to be influenced by NP crystal structure as well as exposure to ultraviolet light. We analyzed the toxicity of SunNano (anatase) and Degussa (3:1 anatase:rutile) TiO₂ NPs in the presence and absence of Suwannee River HA after dark and simulated sunlight light exposure using zebrafish embryos. We found that Suwannee River HA significantly increased toxicity of Degussa TiO₂ NPs after dark and simulated sunlight exposure; however the increase in toxicity is not as drastic for SunNano TiO₂ NPs.

CLAUDIUS REDEFINED

Jordan Andrew Kook, Marc Kleijwegt (Mentor), History

Scholarship has portrayed the emperor Claudius as an inept fool, utterly incompetent and unsuited to be emperor, with modern and ancient historians labeling him as a passive figurehead who allowed his wives and freedmen to rule in his stead. However, this thesis argues that rather than condemning Claudius, history reveals that he had foresight and vision for the future development of the empire. Through his controversial speech to the Roman Senate in 48 CE, Claudius encouraged the admission of Gallic chiefs into the senatorial order, exhibiting ingenuity in changing the approach of integrating provincials into the Roman sphere of governance. His concept of allowing provincial nobles to rise to the level of senators became a precedent, as it was followed by later emperors and helped to allow Rome to flourish as a multi-cultural empire for centuries after Claudius' reign.

THE EFFECTS OF TRAUMATIC BRAIN INJURIES ON THE DEVELOPMENT OF EPILEPSY

Robin Kraidich, Craig Levenick (Mentor), Neurology

To better understand epilepsy a study is being conducted to find if there is a correlation between traumatic brain injuries (TBIs) and the development of epilepsy. Rats are given a TBI and have electrodes attached to their skull so EEGs can be recorded. Through this recording scheme the lab is better able to track the development of seizures and other symptoms of epilepsy. Thus far the lab has seen a positive correlation between TBIs and the development of epilepsy. With the research gathered by this section of the lab another section is working to develop a medication for the treatment of epilepsy.

STABILITY IN PARENTING STYLES FROM CHILDHOOD THROUGH ADOLESCENCE

Kerstin Krautbauer, Janet Hyde (Mentor), Psychology

Parenting behavior is a powerful influence on a child's development. A wealth of research has been devoted to specific styles of parenting - authoritative, authoritarian, permissive, and rejecting-neglecting—but little attention has been dedicated to the question of stability in parenting styles throughout development. Using longitudinal data from the Wisconsin Study of Families and Work, this study investigates differences in parenting styles between the ages of 4.5 and 18 years of age. Based on previous literature it is hypothesized that the basic foundations of the parenting styles will remain stable across this time frame. Furthermore, this study examines child temperament as a moderating variable when parenting styles do shift, with the belief that more extreme temperaments will lead to greater change in parenting style.

ACRYLIC TESTS FOR THE DAYA BAY REACTOR NEUTRINO EXPERIMENT

Michael Krohn, Karsten Heeger (Mentor), Physics

My project has been to understand the properties of Poly(methyl methacrylate), otherwise known as acrylic, in order to minimize systematic errors and test mechanical and materials compatibility issues in the Daya Bay reactor neutrino experiment. The goal of the Daya Bay reactor neutrino experiment is to determine the last unknown neutrino mixing angle θ_{13} with a sensitivity of .01 or better. Acrylic is an important component in the antineutrino detectors and we have multiple tests designed to determine the unique properties of it. These tests address both the mechanical and technical issues of the detector as well as the systematic affects introduced by the acrylic. This will allow the results that we get from the Daya Bay experiment to be more accurate and reliable.

ABSTRACTION IN PAPER

Jonathan Kruschke, Sophia Flood (Mentor), Art

When I begin a piece such as this, I typically begin with a line. At this point, I do not have a well developed concept of the final drawing; rather, I am only making marks. After enough marks are on the paper, I begin to connect them, searching to create forms that repeat the resemblance of lines, angles, and curves within the area I am drawing. When I am able to perceive structures, I imagine them as composing the geography of a landscape. This landscape becomes more visible through the incorporation of lines unguided by rulers. These organic lines may serve to resemble the flora of the perceived landscape or serve as a way to add dimension to structures as a texture. By limiting myself to black ink leaves only the other media used responsible for adding color to the piece. This piece was a personal exploration into the mental and physical environment in which an artist engages; an exploration that lead me to the realization that an artist's vision should not always be confined to the surfaces he/she applies that vision to. With that being said, my first line was drawn on a full sheet of cold-pressed cotton.

LOCALIZATION OF SENSORY RECEPTORS IN EPITHELIUM OF THE LARYNX

Kyle Kuczynski, Michael Hammer (Mentor), Surgery

Amidst a combination of debilitating symptoms, victims of Parkinson's disease suffer from decreased sensory function in the airway. This impediment leaves patients vulnerable to disorders such as aspiration pneumonia, a chronic infection resulting from failure to clear foreign substances from the airway. Protective mechanisms like coughing and swallowing are normally triggered by sensory receptors, but for reasons unknown sensory dysfunction appears in degenerative diseases. Rehabilitating treatments are in practice today, but without a proper understanding of sensory dysfunction, treatments are undoubtedly falling short of their full potential. The objective of this research is to gain a comprehensive understanding of the sensory receptors of the larynx. This knowledge will be a dynamic tool for developing effective treatments in the future.

ACTIVE AND SEDENTARY BEHAVIOR PATTERNS PREDICT MENTAL HEALTH AND QUALITY OF LIFE IN HEALTHY WOMEN

Alexa Kuffel, Dane Cook (Mentor), Kinesiology

The benefits of being physically active and the risks of being sedentary for physical health are well documented. However, less is known about their relationship with mental health. The purpose of this research is to determine if physical activity patterns predict mental health and quality of life in healthy women. Women completed questionnaires examining mood and quality of life. Physical activity was also assessed. Results from a mixed model Anova demonstrated a significant main effect of physical activity on mood and quality of life. Results suggest maintaining an active lifestyle has mental health benefits. Low levels of physical activity with low levels of sedentary behavior appear better than insufficient activity and highly sedentary behavior, suggesting there are benefits for mental health even with light activity.

MYCOBACTERIUM'S ROLE IN CROHN'S DISEASE

Matthew Kunz, Paul Hulseberg (Mentor),
Pathology and Laboratory Medicine

Crohn's is a disease that negatively affects the digestive tract. The body's immune system is unable to distinguish between harmful, intruding bacteria and those naturally present in the body. Essentially, foreign bacteria trick the body into attacking itself, resulting in gut inflammation. We use special mice and pathogens to test a popular hypothesis that foreign pathogen infection induces self-reactive immune responses resulting in gut pathology. Previous experiments testing this hypothesis led us to believe these cross-reactions alone are not sufficient to cause Crohn's. For this reason, and with support in the literature, we are currently testing the hypothesis that host genetic anomalies may be required to allow for the development of Crohn's-like pathology. Our studies aim to further the knowledge into the possible cause of Crohn's.

ANALYSIS OF GENETIC INTERACTIONS IN GRAVITY SIGNAL TRANSDUCTION IN ARABIDOPSIS THALIANA

Joseph Kutschenreuter, Allison Strohm (Mentor), Genetics

Gravitropism is the process by which plants direct root and stem growth in response to gravity. The mechanical force of gravity is converted to a chemical signal in a process not fully understood. My investigation of genetic relationships between genes known to function in gravitropism (PIN3 and MAR2) will provide insight into the gravity signal transduction pathway. Additionally, I identified three candidate genes with unknown functions that may be involved in gravitropism. Using a genetic approach, I will determine if these genes are likely to function in this process.

OCT-1 INTERACTS WITH THE EPSTEIN-BARR VIRUS BRLF1 PROTEIN TO PROMOTE DISRUPTION OF VIRAL LATENCY

Swee Sen Kwek, Shannon Kenney (Mentor), Oncology

Epstein-Barr virus (EBV) is a human herpesvirus which persists in host cells as a latent infection. To exit latency and enter the productive lytic replication phase, the virus encodes two essential immediate-early viral genes, BZLF1 and BRLF1. This latent-to-lytic switch is an essential part of the viral life cycle. Here we demonstrate that the ubiquitously expressed cellular transcription factor, Oct-1, cooperates with BRLF1 to induce lytic reactivation through a direct protein interaction. Using shRNA technology, we show that loss of endogenous Oct-1 results in a decrease in constitutive lytic viral infection in both B-cells and epithelial cells. We also show that Oct-1 enhances R-transcriptional activation using reporter gene assays. Taken together, our results suggest Oct-1 is an important positive regulator of EBV lytic gene expression.

WHAT MOM DOESN'T KNOW WON'T HURT HER: THE STRUGGLE BETWEEN PRIVACY AND SELF- PRESENTATION ON FACEBOOK

Erica Lachat, Young Kim (Mentor), Journalism and Mass Communication

This research examines the relationship between individuals' privacy concerns and self-portrayal on online social networks. While it is common to hear skepticism regarding what private information should be released online, creating an online persona through social network sites has become equally universal. This study questions the inherent juxtaposition between the "identity workshop" (Turkle 1995) through self-presentation practices and the fear of privacy breach in terms of "contextual integrity" (Nissenbaum 2004) on online social networks. Using Facebook as a case, I conducted an online survey and twelve in-depth interviews to better understand motivations and common behavior patterns when using online social networks. A preliminary analysis of the in-depth interviews indicated that despite common privacy invasion concerns, many people were willingly publishing private information about themselves on online social networks for self-presentation purposes. However, individuals still want control over the flow and use of information. The implications of the study are discussed in terms of the notion of privacy in the new media environment.

ALCANCE

Zoe LaLonde, Sophia Flood (Mentor), Art

I wanted to explore the ideas of loneliness and distance. This area of the Memorial Union caught my attention, as it seemed that the pavement itself was attempting to stretch across Mendota and touch the other side. Evidence of human life existed around the pavement, yet there was no proof that anyone had successfully reached the other side. The thought of seeing far off goals and having to question their attainability is rather terrifying to me, especially as a college student whose dreams are grandiose and large in quantity. Perhaps I am in need of a team of sled dogs.

SPEECH PERCEPTION IN REACHING TODDLERS

Alyssa Lamers, Ruth Litovsky (Mentor), Communicative Disorders

Cochlear implants are surgically implanted hearing aids for people with profound deafness. The way children with cochlear implants process speech is a relatively unexplored field, but it can have a significant impact on developing language skills. This study tests the hypothesis that children with cochlear implants will discriminate between speech sounds less quickly and with less accuracy than age matched normal hearing peers. Both groups of children are being tested with a behavioral method, in which children reach through holes on an apparatus according to which speech sound they perceive. This study will add to the limited knowledge about how children with cochlear implants process language, enabling informed decisions about the best speech and language treatment options for children with cochlear implants.

DANCE IMPROVISATION: INVENTIVE APPROACHES TO THE CREATION AND PERFORMANCE OF CHOREOGRAPHY

Jamie Landry, Carlyn Pitterle, Katherine Corby (Mentor), Dance

Dance improvisation is often utilized as a tool for spontaneous movement generation, which can facilitate new and progressive forms of choreography and performance. The goal of this project was to research practical applications of improvisation specifically in the choreographic process. An essential component of our research involved working closely with San Francisco-based dance improvisation artist Kathleen Hermesdorf. Hermesdorf uses improvisation as a tool for individual movement invention. Through rehearsals and classes we explored her choreographic approach and used these techniques to create an improvisation-driven dance work.

INVESTIGATING THE ROLE OF CASTOR AND POLLUX IN MYCORRHIZATION IN POPLAR

Kelsey Larsen, Muthusubraman Venkateshwaran (Mentor), Agronomy

Mycorrhization is a mutually beneficial symbiosis that occurs between plants and mycorrhizal fungi. Arbuscular mycorrhization and ectomycorrhization are two major types of mycorrhization which facilitate enhanced phosphorous uptake by plants. It is known that the ion channels CASTOR and POLLUX play a definitive role in the establishment of arbuscular mycorrhizae in plants, yet much remains unknown about their role in ectomycorrhization. *Populus trichocarpa* (poplar) undergoes both types of mycorrhization; performing mycorrhizal assays using transgenic lines in which either CASTOR or POLLUX expression is knocked down allows us to better comprehend the correlation between these ion channels and the formation of ectomycorrhizae. Characterizing the functions of these genes lends heightened understanding in the fields of symbiotic signaling pathway, the evolution of land plants, and sustainable agriculture.

CENTRAL NERVOUS SYSTEM REPAIR

Lynsey Lauderdale, Bermans Iskandar (Mentor), Neurology

It is known that the mammalian central nervous system (CNS) is irreparable after injury. We have shown that CNS regeneration improves in response to treatment with folic acid. Folic acid has epigenetic implications. Based on preliminary data, we would like to examine whether the improvement related to folic acid is transmitted through generations. We will therefore trace the inheritance of the FA effect in offspring and measure CNS regeneration in rats that were not directly treated with FA. Positive results have great implications on the inheritance and treatment of human CNS injury and disease in humans.

THE EFFECTS DRINKING HAS ON ONE'S ACADEMIC ACHIEVEMENT AND PSYCHOLOGICAL WELL-BEING

Kayla Laufenberg, Abbey Eckhoff, Kristin Gunderson, Sun Kang (Mentor),
Human Development and Family Studies

The impact alcohol has on a college student's academic achievement and psychological well-being. The purpose of this study is to further examine the relationship between drinking, psychological well-being and academic achievement. Methods: Participants consist of predominately junior and senior undergraduate students from university campuses. We will be using Facebook to electronically administer the surveys. Psychological well-being will be measured by CES-D (depression scale) and alcohol consumption habits will be measured by Rutgers Alcohol Problem Index and Personal Striving assessment. Data collection will be completed by March 31, 2011. We hypothesize that binge drinking has a negative effect on one's academic achievement and psychological well being.

AN INTERACTION BETWEEN THE INVASIVE ROUND GOBY AND NATIVE FISHES ACROSS A GRADIENT OF GOBY DENSITY

Gabrielle Lehrer-Brey, Matthew Kornis (Mentor), Center for Limnology

Species invasions are considered a major driver of global ecological change, and the magnitude of an invader's impact on a system is correlated with its abundance. Round gobies were discovered in the Great Lakes in the early 1990s, have since had negative impacts on native fish populations, and are now expanding into tributaries of the Great Lakes. To learn about their impacts on native fishes in streams, we conducted an in-stream mesocosm experiment across a gradient of round goby density. Our results showed that when compared to the control, a low goby treatment led to weight loss in native fishes. Relative to the low goby treatment, a high goby treatment led to weight gain in native fishes and weight loss in round gobies.

WHO ARE TODAY'S RESILIENT COLLEGE STUDENTS?

James Lemke, Tolu Oyesanya, Ashley Radke,
Linda Oakley (Mentor), Nursing

The purpose of our study is to assess resilience coping responses in college students who have or do not have military experience. Evidence suggests that student Veterans with military experience and undergraduate college age young adults may face unique, as well as similar life stressors that could have a harmful impact on healthy adjustment to college student life. Specifically, transition to college student life could impact important relationships, routines, and resources. Current evidence provides no data showing personal factors likely to increase or decrease healthy resilience in transitioning students. This survey emailed to students, designed to assess resilience in undergraduate students with (N = 773) and without (N = 400) military experience, can improve the characterization of predictors of healthy resilience in today's college student.

COMPARATIVE STUDY OF GLUCOHYDROLASE ACTIVITY IN THE SMALL INTESTINE OF HOUSE MOUSE AND HOUSE SPARROW

Krista Lessner, William Karasov (Mentor), Forest and Wildlife Ecology

Plant secondary metabolites (PSMs) are chemicals that may be used by plants for self-protection against herbivores. Glycosides, a group of PSMs, are characterized by being bound to a glucose molecule, becoming active upon hydrolysis. Certain enzymes in the mammalian small intestine have shown to be important in hydrolyzing glycosides. We examined the ability of the small intestine to hydrolyze amygdalin, sinigrin, and lactose. Enzyme activity at the apical membrane, or including in the cytosol was measured, respectively, using everted sleeves or homogenates. Activity was measured spectrophotometrically based on glucose production and expressed as $-\mu\text{moles}/\text{min}/\text{g}$ tissue. Preliminary results show measurable activity in the House mouse towards lactose at the apical membrane and to amygdalin in the cytosol. The House sparrow had little to nil activity.

THE POTENTIAL OF HUMAN NEURAL STEM CELLS AS A TREATMENT TO IMPROVE RECOVERY OF ISCHEMIC STROKE

WaiYin Leung, Matthew Jensen (Mentor), Neurology

Stroke is a leading cause of death and disability, and new treatments are needed. To improve quality of life for stroke survivors, our research seeks a solution to improve recovery. We are evaluating the use of human induced pluripotent stem cells, which are differentiated into neural stem cells, to attempt to replace the brain cells lost by stroke. A key component of our research involves the use of advanced stereologic techniques to quantify graft cell survival in the post-ischemic rat brains, and then correlate graft cell survival with behavioral recovery.

THIS AMERICAN LIFE: WHERE THE HEART IS

Kim L'Herault, Natalie Perry, Paige Miller, Jonathan Berger, and
Erica Halverson (Mentor), Curriculum and Instruction

The objective of this project was to create a This American Life style radio story. Our piece is the combination of four individual stories conveyed through the radio medium. The prologue introduces the concept of Home, which all of the pieces are centered around. In the first act, "It's All Relative," Natalie Perry speaks about her large unconventional family and her multiple homes. The second act, "Best of Buds," tells stories from Paige Miller's abnormal group of friends in her hometown. Jonathan Berger explains his dramatic change of his home as he begins his freshman year of college in the third act, "The Golden Frozen Tundra." The final act, "Where You're You," tells Kim L'Herault's story of moving during high school and her tough college decision.

PREFERENTIAL INTERACTIONS OF ALCOHOLS AND HYDROXYLATED SOLUTES WITH DNA BASES ANALOGUES

Emily Lingeman, M Thomas Record Jr (Mentor), Chemistry

Cells use osmolytes to counteract water loss under conditions of osmotic stress and to protect proteins and nucleic acids from denaturation in response to environmental stress. Solutes perturb protein and nucleic acid stability through “preferential interactions,” favorable or unfavorable interactions with chemical functional groups on the biopolymer exposed upon unfolding. Understanding the effects of the solutes on proteins and nucleic acids is important for understanding how solutes drive crystallization, regulate water retention, and cause or prevent protein folding/unfolding. To develop the ability to interpret and predict effects of hydroxylated osmolytes, we study the effects of a series of alcohols on the stability of DNA hairpin, and interpret the data in terms of interactions between the solute and functional groups on the DNA base.

A HISTOLOGICAL EXAMINATION OF THE MOUSE PROSTATE VASCULATURE

Christopher Loftus, Wade Bushman (Mentor), Urology

The prostate is a male accessory sex organ that develops in response to androgen stimulation. The first step in prostate development is the formation of epithelial buds that elongate and branch to form the ductal system of the adult prostate. Simultaneously, vascular growth of the prostate must complement such ductal growth. Vascular irregularities have been implicated in prostatic diseases such as benign prostatic hyperplasia (BPH); however, little is known about the changes that occur in prostate vasculature. The goal of this study is to present a comprehensive model of the normal mouse prostate vasculature so that it can be compared with pathologies that mimic clinical conditions. My research maps the macroscopic and microscopic vascular anatomy of the mouse prostate using both whole mounts and immunohistochemistry.

OVER AND UNDER

Thao Pao Lor, Thomas Berenz (Mentor), Art

The Marquette Interchange located in Milwaukee, WI was one of the most expensive highway construction sites in the history of Wisconsin and serves as a vital organ of transportation locally and beyond. Many people can drive on this interchange and don't realize the importance of it until they analyze what makes it so profound. The impact of the Marquette Interchange allow the thousands of commuters access to suburbs and communities of Milwaukee transforming the way people live and travel. With this drawing, I plan to send a message to the viewers that the respect of these mega-structures should be well appreciated as it keeps the drivers and travelers as safe as possible on the road.

UNDERSTANDING HMONG WOMEN'S BELIEFS, FEELINGS AND NORMS ABOUT SCREENING FOR BREAST AND CERVICAL CANCER

Maichou Lor, Diane Lauver (Mentor), Nursing

Hmong women are less likely to seek breast and cervical cancer screening and more likely to be diagnosed with advanced disease. A theory of care-seeking behavior (TCSB) explains that a) beliefs, b) feelings, c) social norms, and d) external barriers influence people's use of screening. With a descriptive design, we examined Hmong women's beliefs, feelings, norms, and barriers regarding breast and cervical cancer screening. In a Midwestern community center, sixteen Hmong women were interviewed in Hmong. Questions were guided by the TCSB. Content analyses of audiotapes revealed participants: a) believed screening was painful, b) felt embarrassment, feared unfamiliar tests, c) shared norms about modesty and deference to husbands' opinions, and d) wanted good interpreters. Findings can guide culturally-sensitive education and screening for Hmong women.

DIFFUSION TENSOR IMAGING: MICROSTRUCTURAL PROPERTIES OF WHITE MATTER OF MONKEY MODELS AND AGE

Sharon Lu, Andrew Alexander (Mentor), Medical Physics and Psychiatry

Adolescence is a period of higher risk for internalizing disorders--in particular anxiety and mood disorders. In our study, developmentally equivalent rhesus macaque monkeys were scanned with diffusion tensor imaging (DTI) to characterize the microstructure of white matter pathways associated with anxiety (amygdalo-frontal pathways). Specifically, I perform image processing and regression analyses to explore correlations between age and DTI measures in order to determine if age is a potential confound or co-variate in DTI analyses and to study temporal effects of anxiety with age. Future work will explore DTI measures' relation with anxiety measures. Our long term goal is to find underlying neural bases for impaired emotion regulation and risk factors for anxiety and mood disorders by analyzing structural connectivity and abnormalities in amygdalo-frontal pathways.

DIGITALLY DESIGNED TEXTILES INSPIRED BY WEST AFRICAN ADINKRA SYMBOLS

Erica Lubetsky, Jennifer Angus (Mentor), Textile and Apparel Design

As a modernized urban brand of clothing with an African theme, Koshie O is a blend of traditional African culture and contemporary urbanized America. The designer behind Koshie O, Nina Baksmaty, has previously been using fabric that has been designed and printed in Ghana, and inspired by the Adinkra Symbols of West Africa. I will be investigating the meanings of these Adinkra Symbols as well as furthering my skills in Photoshop and Pointcarre, a textile industry software, to create digital designs inspired by the symbols and colors of West Africa to be used in future Koshie O designs.

PATHFINDER GAME PROJECT

Katie Lucarelli, Mary Carnes (Mentor), Medicine

There is a large body of evidence that suggests unconscious or implicit bias hinders the progress of women and ethnic minorities in academia. Implicit bias is detrimental because it narrows the scope of ideas and resources available for scientific advancement. The purpose of this research is to measure and reduce faculty's implicit bias against these groups within academic science, technology, engineering, mathematics, and medicine (STEMM) through the use of an educational video game. In the current study, implicit bias will be measured with race-gender-science versions of the Implicit Association Test (IAT). Participants will then play a video game designed around evidence based strategies to reduce bias. Expected results of a subsequent IAT will show faculty members have reduced levels of implicit bias after game play.

STONE BEADS OF ANCIENT AFGHANISTAN: STYLISTIC AND TECHNICAL ANALYSIS

Geoffrey Ludvik, Jonathan Kenoyer (Mentor), Anthropology

Afghanistan occupies a unique geographical position at the crossroads of Asia on the trade routes between East and West. Among the many people, ideas, and objects that moved through and remained in Afghanistan, stone beads were among the most common. By analyzing the Afghanistan Antique Beads collection of agate, carnelian, faience, turquoise, jasper, and lapis lazuli beads this study proposes to determine their manufacture techniques, specifically what types of drills were used and what cultures produced them. Employing various processes developed on the basis of chronologically defined collections, I expect to identify the range of chronological periods represented by these beads. Additionally, this project will test the validity of chronological indicators from other regions and determine whether they are broadly applicable to Afghanistan as well.

SALMONELLA ENTERICA GENES REQUIRED FOR SURVIVAL ON LETTUCE

Jessica Lund, Jerim Barak-Cunningham (Mentor), Plant Pathology

Salmonella enterica uses specific molecular mechanisms to colonize lettuce plants and other produce. Human health is at risk from eating produce which is contaminated by *S. enterica*. By understanding the mechanism of *S. enterica*'s persistence, efforts to prevent and remove contamination can be strengthened. This experiment aims to identify the specific genes required for *S. enterica*'s survival on lettuce plants by testing mutants and wild-type for growth in lettuce lysate. A leaf lysate, prepared by crushing lettuce leaves, was inoculated with bacterial strains and populations were enumerated 24 h post-inoculation. Preliminary results identified a glyA mutant with a reduced growth phenotype compared to the wild type. These results are proof of principal to identify essential metabolic networks of *S. enterica* utilized during growth in lettuce.

EFFECT OF MATERNAL DIABETES ON INFANT RAT AND ROLE OF IRON IN KIDNEY FORMATION AND HYPERTENSION

Rebecca Lundberg, Pamela Kling (Mentor), Pediatrics

The purpose of this research is to see if there is a correlation between hypertension seen in infants of diabetic mothers (IDM) and insufficient iron delivery to the kidneys during development. Slides of kidneys of either 7-month-old IDM or control rats were qualitatively examined in a blind study. Resting blood pressure was determined in the rats before sacrifice. The male IDM were hypertensive at rest, compared to the female IDM.

SOCIAL SUPPORT AND PSYCHOLOGICAL WELL-BEING

Kelly Lyke, Ashley Blaine, Celeste Hammer, Sun Kang (Mentor),
Human Development and Family Studies

College stress and depression are common, but this study is researching if this is less common in students who have good social support and feel they matter to others. Many previous studies focused on first year students (Dixon et al; Kenyon, D., & Koerner, S., 2009). Participants will include approximately 125 UW–Madison students. Social support will be measured using the Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet & Farley, 1988). Psychological well-being will be measured using Ryff’s Scale of Psychological Well-being (1989). Data collection will be completed by March 31, 2011. We hypothesize that having social support will lessen occurrence of depression and that actively giving social support to others will have a greater benefit on psychological well-being than just receiving support.

MASCULINITY AND FEMMEPHOBIA

Rae Lymer, Ellen Samuels (Mentor), Gender and Women’s Studies

My thesis focuses on how masculinity correlates with femmephobia within the assigned-female at birth queer and trans communities and how that relates to similar trends found within the cismale heterosexual community on the University of Wisconsin–Madison campus. My research is comprised of literature review and interviews. Interview participants are comprised of individuals of diverse backgrounds, and all interviewees are either undergraduate or graduate students at UW–Madison. These interviews focus on genderized behaviors noticed by participants within their individual communities and draw on their personal experiences of discrimination, competition to prove one’s gender, and pressures to conform to social expectations. It is evident that the push to be more masculine in both communities results in the invisibility or discrimination against feminine individuals.

THE EFFECT OF BRAIN TRAUMA ON COGNITION AND FUNCTION

Madison Magad-Weiss, Craig Levenick (Mentor), Neurology

This project examines the effects of traumatic brain injury on the cognition and function of rats. Two colonies of rats are being studied, rats who are susceptible to epilepsy, the others not. EEG recordings have been used to measure the frequency of seizure activity from the various colonies with varying degrees of brain injury, with some rats receiving drugs and some saline. The groups are then compared to control animals. The goal is to determine if genomic and novel MR imaging methods can predict development of post-traumatic epilepsy (PTE) and post-traumatic stress disorder (PTSD) in epilepsy susceptible and epilepsy resistant rats. The study is also attempting to therapeutically reduce PTE and PTSD after TBI by brief treatment with a glucose analog anticonvulsant.

PASSIVE USER TRUST: DESCRIPTION OF PHYSIOLOGICAL METHODS IN INTERPERSONAL INTERACTION

Dhruv Mahtta, Enid Montague (Mentor), Industrial Engineering

The aim of this research study was to examine the effects of active user's (person directly operating the technology) use of technology on the physiological measures of the passive user (person observing). This has huge implications in the medical field where a doctor's (active user) use of technology can have positive or negative effects on the patient's (passive user) satisfaction, health and well being. We recruited 66 participants (33 pairs of active and passive users) and measured passive user's electrodermal (Galvanic Skin Response, GSR) and electrocardiogram (ECG) data while the active user operated the technology. As part of using the technology, the active user was asked to operate computer software (Multi-attribute Task Battery, MAT) and finish assigned tasks with three different difficulty levels. With the help of Biopac Acqknowledge software, GSR and ECG graphs were analyzed to obtain heart rate in beats per minute and electrodermal activity events.

SCREENING OF T-DNA KNOCK-OUT RPT4A MUTANTS OF THE 26S-PROTEASOME IN ARABIDOPSIS

Sheryl Man, Do Kim (Mentor), Genetics

The 26S-proteasome is an ATP-dependent protease complex that is responsible for the selective degradation of mainly ubiquitylated proteins in eukaryotic cells. The protease complex is composed of a 20S core protease (CP) and 19S regulatory particle (RP). Using the plant model *Arabidopsis thaliana*, we approached the study the regulatory particle base subunit 4 (RPT4) through T-DNA knock-out mutants from SALK. We screened for *rpt4a* and *rpt4b* mutants through genotyping and reverse transcription and PCR (RT-PCR) of F1 and F2 plants. Preliminary test results of confirmed *rpt4a* and *rpt4b* mutants indicated that both have decreased responsiveness to the plant hormone abscisic acid (ABA). The next steps would be to isolate more mutants and to carry out more tests to characterize their phenotypes.

INTERPERSONAL STRESSORS, ADOLESCENT DEPRESSION, AND GENDER: THE ROLE OF SOCIAL WORLDS

Alison Manley, Janet Hyde (Mentor), Psychology

In childhood, rates of depression between girls and boys are strikingly similar. However, a gender gap emerges between the ages of 13 and 15, when girls become more likely to experience depression than boys. Interpersonal stressors have been implicated in affecting this gap. However, such stressors are complex; the majority of past research has examined them as if they were a homogeneous category. Using longitudinal data from the Wisconsin Study of Families and Work, this study investigates how interpersonal stressors within specific social worlds (family, peer, romantic), influence this gender-depression relationship. Specifically, it examines: depressive reactivity to interpersonal stressors; if reactivity changes over time as youth transition from ages 11, 13, and 15; and whether reactivity can ultimately account for the depression gender difference.

THE NEIGHBORS

Angeline Manske, Thomas Berenz (Mentor), Art

The term “contemporary landscape” often brings to mind a certain kind of architectural design, be that design one of sleekness and progression, or a dismal industrial wasteland. I explore a lesser known aspect of our landscapes: their inhuman inhabitants. It is common knowledge that most towns and cities are home to such scavengers as crows and raccoons, but many larger, much more surprising fauna have also begun to infiltrate our population as time and urban expansion leaves them ever less fearless of man. Camouflaged by their talent for dodging human eyes and our own preoccupation with everyday matters, they have started to establish new ecosystems within the contemporary landscape, for the most part ignored and overlooked by the very beings who created it.

UPPER YOSEMITE FALLS

Tom Marren, Sophia Flood (Mentor), Art

In the 1950s, Walt Disney hosted “The Wonderful World of Disney,” which became famous as the first television show to film and broadcast National Parks in color. The Conservation Act, which created the National Park Service, was created to protect natural spaces from industry. In 2010, the National Park Service had over 280 million visitors from across the world, making these parks some of the largest tourist destinations in the world.

INVESTIGATING THE ROLE OF *MEDICAGO TRUNCATULA* ROPGEF2 IN LEGUME NODULATION

Kayla Martens, Muthusubraman Venkateshwaran (Mentor), Agronomy

Root nodule symbiosis is the symbiotic relationship between legumes and rhizobial bacteria where atmospheric nitrogen is fixed by the rhizobia and supplied to the plant. The establishment of this interaction initiates with curling of root hairs entrapping the rhizobia, entry of rhizobia through root hair and nodule organogenesis. In model legume *Medicago truncatula*, Rop GTPase Guanine nucleotide Exchange Factor 2 (RopGEF2) is required for the normal root hair growth. Silencing MtRopGEF2 results in reduction in root hair length and alteration in root hair architecture. Since, root hairs play a central role in the establishment of root nodules, it is hypothesized that MtRopGEF2 is required for legume nodulation. Using RNAi based gene knockdown strategy, we investigate the role of MtRopGEF2 in symbiotic signaling.

THE CHEMICAL AND PHYSICAL EFFECT OF SUBSTRATES ON OSTEOGENESIS OF HUMAN MESENCHYMAL STEM CELLS

Christopher Martin, Wan-Ju Li (Mentor), Orthopedics and Rehabilitation

Extracellular matrix (ECM) molecules interact with cells to regulate cell activities, such as proliferation and differentiation. Cell-matrix interaction is one of the key molecular mechanisms instructing mesenchymal stem cell (MSC) behavior in a stem cell niche. Biomaterial nanofibers structurally mimicking collagen fibril have been used as a substrate to culture MSCs. We hypothesize that a synergistic effect existing between substrate architecture and coated ECM regulates osteogenesis. We seeded MSCs in 3D nanofibers coated with collagen type I, fibronectin, laminin or vitronectin, and we assessed osteogenesis of the cells by assaying mineralization, the ALP activity, the expression of mRNA transcript and proliferation. To investigate the signaling pathway of activation, we conducted western blotting on integrins, ERK1/2 and FAK.

FRANCOPHONE REACTIONS TO CHRISTIAN DEFEAT AT NICOPOLIS, 1396 CE

William Marx, Karl Shoemaker (Mentor), History

In 1396 CE, Muslim Turks defeated Christian crusaders at Nicopolis, a city in present-day Bulgaria. Shortly thereafter, accounts of and references to the defeat appeared in many European literary works. Moving beyond scholars' traditional preoccupation with the military aspects of Nicopolis, this study analyzes all such works written by Francophone authors—in both French and Latin—in order to understand the ways in which these authors explained the defeat, why they explained it in these ways, and what their explanations indicate about Francophone politics and society ca. 1400 CE. Sources show that a tension between identifying with the Francophone world and identifying with Christendom at large troubled Francophone political thought but did not necessarily reduce the Francophone nobility's urge to participate in the pan-Christian activity that was crusading.

EVERYTHING AND NOTHING

Cassandra Marzette, Thomas Berenz (Mentor), Art

With this particular project, I hope to illustrate the issues regarding the mistreatment and ignorance of poverty and homelessness in society. While this particular work, in no way, gives justice to the reality of it, I hope to relay that these troubles do exist. It seems today that most people focus on the media-tabloids, television, fashion magazines, etc. People, it seems, have turned a blind-eye from the real issues. Through this particular drawing, I hope to open the eyes of those who ignore the more crucial problems in life.

GRAPHENE-BASED ENERGY STORAGE

Amir Mashal, Michael Arnold (Mentor),
Materials Science and Engineering

Improving existing methods of energy storage is one of the great challenges facing society today. A storage material based on graphene can change that. Graphene is an atom-thick sheet of carbon linked in a hexagonal network. It has been attracting great interest due to its unique electrical and physical properties; most notably, it has extremely high surface area and energy density potential. Current energy storage options are limited by the amount of energy stored per unit weight and useable surface area, thus using graphene as the basis for energy storage could lead to a dramatic increase in energy storage capabilities. The goal of our project is to fabricate graphene in a manner that can be used universally to provide exceptional energy storage.

IRX3 AND IRX5 MAY MEDIATE THE BETA-CATENIN SIGNAL TO CAUSE GERM CELL DEATH IN DEVELOPING OVARIES

Natasha Mason, Joan Jorgensen (Mentor), Comparative Biosciences

Loss of Wnt/ β -catenin signaling causes massive germ cell loss in developing ovaries just before birth. Our lab discovered that *Irx3* and *Irx5* are expressed in developing ovaries. These factors are regulated by β -catenin suggesting a central role in ovarian development. We will test the hypothesis that *Irx3*^{-/-};*Irx5*^{G/G} double knockout mice will exhibit germ cell loss, similar to β -catenin disrupted ovaries. *Irx3*^{-/-};*Irx5*^{G/G} mice die around embryonic day (E)13.5; therefore, ovaries will be harvested from E12.5 embryos and placed into short-term culture. We will then evaluate germ cell numbers using immunohistochemistry with the antibody Tra 98. We expect germ cell numbers to be decreased in mutant ovaries, which would suggest that *Irx3/5* mediate the β -catenin signal to cause germ cell death in developing ovaries.

IMPORTANCE OF STREET VENDING FOR URBAN HEALTH AND ENTREPRENEURSHIP

Jamal Matthews, Alfonso Morales (Mentor), Urban and Regional Planning

For decades, street vendors have provided readily accessible food to citizens of the inner city. With growing support for ordinances against street vendors and their products, it is becoming more difficult to provide healthier options for hungry customers as well as stable and honest work for vendors themselves. The purpose of this project is to first locate the areas in New York City most targeted by law and code enforcement and why they are being targeted. Next, this information will be used to help inform the public of the importance of healthier food choices and how street vending can make it a viable option in underrepresented communities. It's importance is key in reshaping public perception of the street as a place of health and well-being.

SEXUAL EDUCATION UNIT FOR KENYA, AFRICA

Dana Mayber, Joyce Hemphill (Mentor), Educational Psychology

After spending a summer in Kenya teaching primary school students, I recognized the dire need to teach students the basics of sexual education. While keeping the Kenyan culture in mind along with the experiences I had in Kenyan classrooms, I carefully and strategically prepared a one-week sexual education unit. The current lack of this information is detrimental to students, and it is important that they be taught these topics. The material covers general human growth and development topics that are pertinent to understanding unfamiliar changes during puberty. The unit also includes information that is helpful to the Kenyan students specifically, such as HIV/AIDS, teen pregnancy, and contraception. Through group activities, discussions, and games, I hope to help promote healthy and responsible choices.

MARITAL QUALITY IN PARENTS OF CHILDREN WITH AUTISM

Madeline McDonnell, Sigan Hartley (Mentor),
Human Development and Family Studies

The purpose of this research is to determine the effects of having a child with autism on parents' marital quality. The process involves observational ratings of spousal interactions during problem-solving discussions and examining their responses on questionnaires pertaining to marital satisfaction. In addition, parents will participate in a daily diary in which they will record their emotions surrounding stressful marital interactions. We will determine whether having a child with autism has a positive, negative, or neutral effect on marital quality, and will identify risk and resiliency factors related to marital quality including the child's behavior problems and the presence of the broader autism phenotype in the parents (i.e., mild and subtle autism characteristics seen in relatives of individuals with autism).

UNDERSTANDING THE SOURCES AND COMPOSITION OF FINE PARTICULATE MATTER IN SOUTHEAST WISCONSIN

Jerome McGinnis, James Schauer (Mentor),
Civil and Environmental Engineering

Since 2002, the Wisconsin DNR and the U.S. Environmental Protection Agency (EPA) have operated the Speciation Trends Network (STN) at sampling sites across the United States that provide chemical composition data for atmospheric fine particulate matter. The STN data from 2002–08 from Milwaukee; Mayville, WI, and Waukesha, WI, has been analyzed using a number of statistical methods including the EPA's positive matrix factorization (PMF) analysis to look for trends in concentrations and sources, as well as the excess pollution. These results are being used to understand the sources of fine particulate matter in Southeast Wisconsin and to determine if regulations should be placed on local sources to improve overall air quality or if regional controls that require coordination amongst different states are necessary.

FM1-43FX SHOWS GONADOTROPIN-RELEASING HORMONE RELEASE FROM THE SOMA AND DENDRITES

Keyneisha McNealey, Ei Terasawa-Grilley (Mentor), Pediatrics

Reproduction is regulated by gonadotropin-releasing hormone (GnRH); understanding its pulsatile nature is the focus of this study. We used K⁺ to depolarize GnRH neurons, derived from the fetal monkey placode and monitored the neurosecretion with a dye, FM1-43Fx. After labeling with FM1-43Fx, changes in puncta were recorded and immunocytochemistry was conducted on the cells with antibodies against GnRH, vesicle associated membrane protein (VAMP) and bassoon (an active zone marker). Results show that FM1-43Fx labeled puncta are vesicles containing GnRH and that GnRH is released from the FM1-43Fx labeled site. In addition, GnRH appears to be released from the soma and dendrites.

EXPRESSION OF EXTRACELLULAR MATRIX PROTEINS DURING DIFFERENTIATION OF MOUSE EMBRYONIC STEM CELLS

Rituparna Medda, Jayne Squirrell (Mentor), Molecular Biology

Embryonic stem cell (ESC) research has the potential to improve medical treatments, but the variability of ESC differentiation makes reaching this goal difficult. Evidence suggests that the extracellular matrix (ECM) plays a role in directing differentiation (Nair et al., 2007). To assess the qualitative expression of the ECM genes for collagen III, laminin, and collagen I in embryoid bodies, messenger RNA extraction from ESCs, Reverse Transcriptase, and Polymerase Chain Reaction was employed. Collagen III expression begins on day 6 and increases from that time point. Laminin and collagen I expression begins on day 0, decreases until day 4, and then increases from day 5 through day 12. Understanding which ECM proteins are expressed during differentiation could be used to direct ESCs into specific cell types.

FORD MOTOR COMPANY

Ellen Meier, Sabrina Pinnix, Debra Holschuh-Houden (Mentor),
Family Business Center

This project will focus on Ford Motor Company and how they have survived multiple generations of family ownership. Like many automobile manufacturers, Ford had a hard time during the economic downturn, but unlike General Motors and Chrysler, they did not suffer as much. We will examine why this was the case and whether or not being a family operated company had anything to do why they fared better than other automobile companies. We will examine the history of Ford, how the family business aspect either hurt or helped their success. We will also compare and contrast Ford with General Motors and Chrysler. We will look at how they are structured, how they handled the recession and where they are today.

VERIFYING REDSHIFTS TO GALAXIES AND QUASARS IN SLOAN DIGITAL SKY SURVEY III

Karissa Metko, John Chisholm, Christina Tremonti (Mentor), Astronomy

The Sloan Digital Sky Survey III is mapping the spatial distribution of 1.5 million galaxies and quasars in order to test currently popular theories of Dark Energy. A key aspect of this survey is determining accurate “redshifts” to these distant objects. Each galaxy observed by Sloan mapped out its astronomical spectrum. The survey disperses the light of each object to produce a spectrum: a graph of brightness as a function of wavelength. Stars, galaxies and quasars produce very distinctive spectra, with emission and absorption features at particular wavelengths that correspond to different chemical elements. Because our Universe is expanding, the light from distant objects has its wavelength stretched and the pattern of spectral features that we observe is shifted to the red. The Sloan Survey uses a fully automated pipeline to classify each spectrum as a star, galaxy, or quasar and to determine its redshift, which is directly related to the object’s distance. My project is to confirm that the redshifts and classifications of the spectra are correct by comparing the observed spectra and best-fit models those spectra. In addition to flagging problematic data, I also search for objects with unusual spectra. We hope to come across some peculiar phenomena, which will lead to a new study.

MEMORY T CELLS ARE OPTIMAL MEDIATORS OF ADOPTIVE CANCER IMMUNOTHERAPY

Justin Meyers, Clifford Cho (Mentor), Surgery

Experimental immunotherapeutic cancer strategies employing adoptive transfer of tumor antigen-specific CD8+ T cells have been promising. However, further work is needed to optimize the methodology of these strategies. The optimal state of differentiation for CD8+ T cells to be employed in adoptive immunotherapy remains unknown. To date, adoptive immunotherapy protocols have typically utilized short-lived effector cells because of their powerful ability to promote cell killing *in vitro*. However, we hypothesized that the unique durability and responsiveness of memory T cells would make them optimal for use in adoptive immunotherapy.

DECEPTION ANALYSIS IN MONETARY NEGOTIATIONS

Ray Michael, Lyn Van Swol (Mentor), Communication Arts

This study seeks to examine the linguistic patterns of liars and truth tellers, the truth bias and deception detection rates in both face-to-face and computer mediated interactions. An experiment was conducted using a dictator game framework; participants were randomly paired and assigned the roles of either allocator or recipient. The allocator was tasked with dividing a small amount of money between the pair, while the recipient had to accept or reject. The recipient did not know the exact amount of money the allocator was given, giving the allocator the ability to deceive; however, this was balanced by an absolute loss scenario if the recipient rejected. Analysis of this experiment will contribute to the understanding of liars, speech patterns, the truth bias and deception detection rates.

LANGUAGE DEVELOPMENT AND EXECUTIVE FUNCTION ABILITIES IN CHILDREN WITH AUTISM SPECTRUM DISORDER

Olivia Mickola, Susan Ellis Weismer (Mentor), Communicative Disorders

The potential association between executive function (EF) and early language skills will be examined in a large sample of preschool children with autism spectrum disorders (ASD). Language abilities will be evaluated using a standardized measure (PLS-4) and EF will be measured using a parent-report measure (BRIEF-P) and a direct measure (FIST); the direct measure will only be administered to a subset of the sample. The research questions are: 1) Is there a significant correlation between a parent-report measure of EF and language abilities in a large sample of preschool children with ASD; and 2) Are there significant correlations between a direct measure and a parent-report measure of EF and language performance in a subset of high-functioning preschoolers with ASD? It is hypothesized that there will be a significant correlation between EF and language abilities in preschoolers with ASD and that there will be significant correlations between a direct and parent-report measure of EF and language performance in high-functioning preschoolers with ASD.

PARENTAL ATTACHMENT, ROMANTIC ATTACHMENT AND PSYCHOLOGICAL WELL-BEING

Nicole Mikolajczak, Hannah Bucholtz, Kirsten Heyde, Melissa York,
Sun Kang (Mentor), Human Development and Family Studies

Young adulthood is a time of many life changes, including romantic relationships and psychological changes. The purpose of this study is to analyze how romantic attachment differs in young adults depending on parental attachment and gender. Additionally the study will determine how males and females' psychological well-being is effected through these attachments. Methods: Participants will include approximately 100 young adults between the ages of 18 and 25. Participants will be selected through systematic random sampling via an online survey. Psychological well-being will be measured by the CED Depression Index and Self-esteem Scale, romantic attachment will be measured using the ECR-R . Parental attachment will then be measured using the parent attachment scale and also the Parental Interference Scale. Results and Conclusions: Data collection will be completed by April 5, 2011.

CELLULAR METABOLISM AS A POTENTIAL TARGET FOR CANCER TREATMENT

Karl Miller, Hannah Barbian, Josef Clark, Michael Polewski,
Rozalyn Anderson (Mentor), Medicine

One important aspect of tumor cell metabolism is the Warburg effect, the observation that tumor cells favor glycolysis over cellular respiration as a source of energy. Manipulation of tumor cell metabolism to reverse this effect is a potential strategy for lessening tumor aggression. The gene PGC-1 α is a positive regulator of mitochondrial energy metabolism that increases cellular respiration when activated. We generated DU145 human prostate cancer cell lines that over-express PGC-1 α . We show that PGC-1 α negatively correlates with invasive capacity and cell adhesion, two markers of tumor aggression. These findings indicate that a relationship exists between cellular metabolism and tumor aggression, and suggest that the PGC-1 α pathway is a potential target for the treatment of cancer.

COPING WITH COMPETITION: THE MEDIATING ROLE OF TESTOSTERONE

Rebecca Miller, Judith Harackiewicz (Mentor), Psychology

The proposed study aims to examine the psychological moderators (achievement orientation) and hormonal mediators (testosterone) of reactions to competition on a learning task. Research suggests that individuals who are high in achievement motivation (HAMs) have positive challenge reactions to competitive contexts, and those low in achievement motivation (LAMs) have negative threat reactions, and that these challenge and threat responses predict subsequent interest. We hypothesize that these effects on interest will be mediated by changes in testosterone. In addition, we will test an intervention hypothesized to help LAMs cope with competition.

THE ROLE OF LANDMARKS IN CHILDREN'S USE OF LOCAL SPATIAL REFERENCE FRAMES

Hilary Miller, Vanessa Simmering (Mentor), Psychology

Two studies examined 4- and 6-year old childrens' abilities to identify an object's location relative to other objects. The task involved remembering the location of a hidden toy in an array of cups after a 10-second delay. Study 1 explored how children's performance was influenced by the presence of landmarks and by the availability of different reference frames, which we manipulated by varying whether the table and/or the child moved between conditions. Landmarks aided the performance only of 4-year olds as 6-year olds performed well without them. Study 2 investigated whether teaching 4-year-olds a language strategy, involving repeating sentences about the location of the object, would improve their performance. Results revealed that the performance of 4-year-olds improved when prompted to use this language strategy.

BEHAVIORAL EFFECTS OF ENDOGENOUS FMRFAMIDE-LIKE NEUROPEPTIDES ON DORSAL MUSCLE OF ASCARIS SUUM

Andrew Miller, Antony Stretton (Mentor), Zoology

Chemical signaling processes of the parasitic nematode *Ascaris suum* are central in creating a model to understand how nervous systems control behavior. Research is currently being done to isolate and sequence neuropeptides, including the FMRFamide-like (Phe-Met-Arg-Phe-NH₂-like) peptides endogenous to *A. suum* (AF peptides). By associating neuropeptide localization and sequence information with observed behavioral effects, we hope to better explain the chemical signaling processes of the nematode nervous system. In this study, the effects of two groups of endogenous AF peptides were measured by monitoring the inhibition or potentiation of acetylcholine induced contraction on *A. suum* dorsal muscle strips. Experiments demonstrate that peptides from both groups act to inhibit acetylcholine induced dorsal muscle contraction with varying efficacy and time course.

ATTENTION AND EMOTION REGULATION IN CHILDREN

Emily Mischel, Seth Pollak (Mentor), Psychology

Rumination, a maladaptive coping mechanism involving focus on sad feelings, confers particular risk for depression in adolescence. However, the causal link between rumination and depression is unclear. Previous studies show that rumination is associated with physiological arousal changes and biased attention to sad cues. We propose that rumination causes altered processing of emotionally salient cues and disruption of physiological regulation, which confer risk for depression. This study explored rumination's influence on physiological arousal, attention to sad cues, and processing of reward cues by distracting or inducing rumination in adolescents following a sad mood induction. Results will address rumination's influence on attention biases to emotional faces, monetary and social reward responses, and physiological activation and help elucidate a causal pathway linking rumination with depression.

EFFECTS OF CABLE NEWS POLITICAL TALK SHOWS

Brittney Mitchell, Lindsay Gordon, Roshni Nedungadi, Dhavan Shah
(Mentor), Journalism and Mass Communication

Cable news is an important source of political information. This study investigates the effects of political talk shows that dominate cable. Based on the manipulation of host and guest behavior, we would like to investigate two aspects of media bias. The first is identity activation: Did the viewer like or dislike the guests? If the viewer does or does not like the people in the debate, how is the viewer's perception of the issue changed? The second is media credibility: Did the viewer's opinion on the credibility of the source change based on whether or not the viewer thought the host was biased? This paper, written by a group of undergraduate research scholars, examines these questions.

TICTACTOE

Sarah Mitchell, Katherine Corby (Mentor), Dance

Studying game theory has shown me that almost everything in life is a game. Melding this investigation with my passion for dance, I researched what decisions look like in action. Set amidst a surrealist world of color, texture, pattern and time, “TicTacToe” projects the human decision process through abstract motion. My research took place in the studio, the perfect space to play games. I developed a movement vocabulary via solo improvisation through which my seven dancers could, quite literally, make their next move. They danced freely, working from their own individual hopes and desires and an awareness of a group sentiment. They also created movement using material from games we played in our space. The resulting choreography explicitly demonstrates interpersonal, internal, and imaginary interactions.

QUALITY IMPROVEMENT FOR PEDIATRIC RESIDENTS

Kurt Mittelstadt, Kimberly Bravo, Lakita Maulson,
Kristin Millin (Mentor), Pediatrics

Poor doctor-patient relationships are common. Problems arise from uncomfortable patients, stemming mainly from superficial hospital visits. Residents, doctors, and nurses take progress notes and/or discharge summaries regarding patient visits. Improvement of residents’ notes and interactions with patients may lead to a solution to these problems. Maximum efficiency, accuracy, and insight into how a clinic performs is necessary. By adding standardized screening questions, a standard plan of action, and improving residents’ notes, our hypothesis is that doctor-patient relations and patients’ health will greatly improve. This is done through careful examination of progress notes and analysis of visits. Improvement in these areas has shown to positively affect both doctors and patients.

‘THINK BIG’ TOYOTA HIGHLANDER HYBRID CAMPAIGN

Patricia Mo, Dhavan Shah (Mentor), Journalism and Mass Communication

The ‘Think big’ Toyota Highlander Hybrid campaign was part of a semester-long class project that involved the key steps to a successful advertising campaign: market research, brand strategy, creative production, media buying, promotions and public relations. Each step was assigned to a different student that altogether formed Slate Communications, a fictitious agency that used integrative approach in developing the campaign. This book compiles all steps of the process from research to rebranding of the product to the creative brief with ads and commercial spots, to the application in media.

LOCAL TIME-STEPPING ADAPTIVE MESH REFINEMENT TECHNIQUES FOR DISCONTINUOUS GALERKIN METHODS

Scott Moe, James Rossmann (Mentor), Mathematics

This research project is concerned with the development, implementation, and testing of a class of numerical methods for solving advection equations on the surface of a sphere. Such systems arise in the modeling of pollutant transport in the atmosphere and oceans. The DoGPack software package, which was developed in the Mathematics Department at UW–Madison to solve a broad class of partial differential equations (PDEs) via the discontinuous Galerkin finite element method (DG-FEM). An initial near-uniform mesh based on curved triangular elements will be generated via the twisted-icosahedral grid approach. This software package has been modified to implement time-stepping with Adaptive Mesh Refinement (AMR).

THE RELATIONSHIPS AMONG TOTAL IGE AND RHINOVIRUS-INDUCED INTERFERONS IN PERIPHERAL BLOOD

Daniel Montville, Robert Lemanske (Mentor), Pediatrics

Rationale: Allergic individuals have more severe respiratory illnesses than non-allergic individuals. The mechanisms underlying this remain unclear; thus, we examined the relationships between allergic sensitization and rhinovirus (RV)-induced types I, II, and III interferons (IFN) in peripheral blood. Results: RV-induced IFN-alpha was inversely associated with Total IgE (r-value= -0.5284, p-value=0.03). A similar, but not statistically significant, relationship was seen between IFN-lambda and total IgE (r-value= -0.4136, p-value= 0.11). In contrast, RV-induced IFN-gamma responses did not correlate with total IgE (r-value= 0.3414, p-value=0.20) Conclusion: Lower IFN-alpha, and potentially IFN-lambda, responses to RV infection in children with increasing total IgE may predispose them to increased viral replication and to more severe viral respiratory illnesses.

HOW THE UNITED STATES LOST IRAN: WASHINGTON'S DESTABILIZATION OF THE SHAH'S REGIME IN THE 1960S

David Morris, Jeremi Suri (Mentor), History

America's blind eye to the failure of the Shah's modernizing reforms (the White Revolution), perpetuated a degenerating cycle of poor policy planning that lasted throughout the 1960s and reduced economic and military aid to Iran. It was America's lack of insight into Iran and the Shah's position in the Middle East that destabilized his only political pillar (the armed forces) and mobilized sections of the population under one man in the 1979 Islamic Revolution. This revolution has had major implications for modern geopolitics in the Middle East and has made it difficult for the United States to spread its influence there. It was specifically due to these deep-rooted failures throughout the 1960s that caused the United States to eventually "lose" Iran.

THE ROLE OF ESCRT:UBIQUITIN INTERACTIONS DURING RECEPTOR DOWNREGULATION

Kylee Morrison, Anjon Audhya (Mentor), Biomolecular Chemistry

Regulated growth factor signaling is necessary for the normal growth of multicellular organisms. Termination of receptor signaling is mediated by the transport of active receptors to the lysosome for degradation. This process requires receptor ubiquitinylation, a modification that is recognized by a set of endosomal protein complexes collectively known as the ESCRT machinery. In particular, the ESCRT-0 complex contains two subunits, Hrs and STAM, both of which bind to ubiquitinated cargo proteins. However, the importance of each subunit in the termination of receptor signaling remains unclear. Our ultimate goal is to determine the unique roles of Hrs and STAM, which are both essential for the normal development of multicellular organisms, in ESCRT-0:ubiquitin interactions. Methods and data collected thus far will be presented.

EFFECT OF 3-HYDROXY-3-METHYLGLUTARYL-COENZYME A REDUCTASE (HMGR1) ON ENOD11 EXPRESSION IN MEDICAGO T

Alyssa Morrow, Jean-Michel Ane (Mentor), Agronomy

For the past 480 million years, arbuscular mycorrhization (AM) has been a crucial biological relationship between AM fungi and a majority of land plants. Like AM, legume nodulation (LN) between rhizobia and legumes accelerates nutrient uptake, specifically of nitrogen, in plants. 3-hydroxy-3-methylglutaryl-coenzyme A reductase 1(HMGR1) is one enzyme present in both mutualistic symbioses which may affect gene expression in LN and AM. I have found that knocking down HMGR1 in *Medicago truncatula* through RNA interference decreases ENOD11 expression, a gene activated late in the early signaling cascade of LN and AM, affirming HMGR1's influence in gene expression. Understanding the function proteins like HMGR1 in these symbioses may eventually incite the engineering of crops currently capable of AM to facilitate LN, allowing for the acceleration of nitrogen uptake in agricultural crops.

DEVELOPMENT AND CHARACTERIZATION OF 16 NOVEL GENETIC MARKERS FOR HOFFMANN'S TWO-TOED SLOTH

Wynne Moss, Jonathan Pauli (Mentor), Forest and Wildlife Ecology

The Hoffman's two-toed sloth (*Choloepus hoffmanni*) is an arboreal mammal found throughout the Neotropics. Due to its limited dispersal power and reliance on forest cover, *C. hoffmanni* is likely to be impacted by habitat fragmentation. The response of two-toed sloths to landcover change may be an indicator of habitat quality and connectivity for other threatened vertebrates. To better understand sloth biology and conservation needs, we developed 16 microsatellite markers for two-toed sloths. Our markers met linkage and Hardy-Weinberg equilibrium expectations. Further, the level of polymorphism for our markers is sufficient for numerous genetic analyses. We will use these markers to investigate dispersal and gene flow among fragmented habitat patches in Costa Rica and describe aspects of two-toed sloth life history.

ENHANCEMENT EFFECT IN ADULT UNILATERAL COCHLEAR IMPLANT USERS

Mitchell Mostardi, Matthew Goupell (Mentor), Waisman Center

Objects in an auditory scene can “pop-out” from the rest of the scene if novel information is introduced. Cochlear implants (CIs) are devices that allow deaf individuals to hear via direct electrical stimulation. Tests with normal-hearing (NH) listeners have revealed “pop-outs,” but it is unclear if they can occur in people with CIs. In this study, CI listeners were presented with a stimulus that elicits a “pop-out” effect in NH listeners. Listeners were asked to match the “pop-out” in the stimulus by identifying the electrode in similar pitch to the one that was “popped-out.” Results show that the pop-out effect occurs in some CI listeners but not others.

MISSION ACCOMPLISHED: DOCUMENTING PARENTS AND YOUTH EXPERIENCES IN A RANDOMIZED CLINICAL TRIAL

Maiong Moua, Susan Riesch (Mentor), Nursing

How individuals perceive their experiences in research studies may affect their level of participation and future participation. It's important for researchers to design studies that are acceptable. The purpose of the study was to describe the experiences of 59 parents and youth in a randomized clinical trial. Two concepts guided the descriptive interviews: meaningfulness of study activities and the authenticity of the quantitative parent-youth communication measures. The research questions were: 1) To what extent were the content and delivery of the intervention memorable, meaningful, and applicable, 2) To what extent did the survey items capture the essence of parent-child communication. A wide variety of responses were gathered, especially among the youth, to assist in bettering research implementation in the future.

COLLEGE RELATIONSHIPS, ACADEMIC ACHIEVEMENT AND PERSONAL EMOTIONAL WELL-BEING

Casey Mullins, Sun Kang (Mentor),
Human Development and Family Studies

The people we experience close relationships with have a large influence on our beliefs and behaviors. We studied personal relationship satisfaction and its effects on academic achievement and quality of personal psychological well-being. We are hoping to have a response rate from between 100 and 150 undergraduate college students. The questionnaire will measure academic success through grade point average, relationship satisfaction through the relationships structure scale and depression through the Center for Epidemiological Studies Depression Scale (Radloff, 1977). Data will be collected by March 31, 2011. We hypothesize that greater satisfaction in a romantic relationship or single status will result in higher academic achievement and a more stable, content psychological well-being.

CHARACTERIZING THE NEUROPEPTIDE CONTENT IN CRUSTACEAN HEMOLYMPH USING MASS SPECTROMETRY

Gajanthan Muthuvel, Lingjun Li (Mentor), Pharmacy

Neuropeptides (NPs) are important signaling molecules found within the circulating hemolymph of crustaceans. NPs are secreted by neuroendocrine organs with regulatory functions, though their specific roles are not well known. By monitoring changes in hemolymph in response to various stresses to crustaceans, such as temperature, salinity, or food deprivation, we could better understand the potential functions of NPs. Hemolymph extraction and processing procedures were optimized for observation of NP expression changes via mass spectrometry (MS). MALDI-MS and LC-MS instruments were used to elucidate the NPs demonstrating significant changes in abundance, implying participation within the stress response. Characterizing NPs of interest within hemolymph provides promising candidates for future physiological experiments.

HEART RATE VARIABILITY AND EYE BLINK STARTLE RESPONSES IN THE STUDY OF COGNITION AND EMOTION

Jessica Namie, Kelsey Wright, Stacey Schaefer (Mentor), Psychology

The objective of the cognition emotion experiment is to explore the relationship between working memory capacity and emotion regulation. Emotion regulation is determined by the subjects' responses to various pictures as well as measurements of their physiological data. Subjects are determined based on their responses in a brief test of working memory, and then called back for participation in two full day sessions in which they complete these tasks that evaluate their ability to regulate their emotions, while we measure various aspects of their physiological responses such as heart rate variability and eye blink startle responses. We predict to find that people with better working memory capacity are better emotion regulators. In addition, we would predict that better emotion regulators will show smaller startle eye blink responses when stimulated by a startling noise. We would also predict that people who are better emotion regulators will have more variability in their heart rates. From this, we can predict that people who show smaller startle eye blink responses will also have more variability in their heart rate.

IDENTIFICATION OF RETINAL GANGLION CELL PROTEINS UNDERGOING OXIDATION AFTER OPTIC NERVE INJURY

Nicholas Nassif, Jee Min, Leonard Levin (Mentor),
Ophthalmology and Visual Sciences

Retinal ganglion cells connect the eye to the brain via the optic nerve. Damage to their fibers (axons) underlies many blinding diseases. Our previous studies showed a correlation between a rise in superoxide levels after axonal injury and subsequent apoptosis of retinal ganglion cells (Lieven et al, 2006; Kanamori et al, 2010). However, the target(s) of the superoxide signal is unknown. We hypothesize that superoxide causes oxidation of critical sulfhydryls in specific retinal ganglion cell proteins. To identify these proteins, we will section retinas to obtain slices containing the retinal ganglion cells, and do proteomic studies to see which proteins undergo oxidative changes when the optic nerve is transected.

PLANT AVAILABLE NITROGEN DYNAMICS FOLLOWING INCORPORATION OF LEGUME COVER CROPS

Cameron Nelson, Matthew Ruark (Mentor), Soil Science

Nitrogen (N) is often the limiting factor in organic low-input vegetable systems. Limited field-based information exists which demonstrated proper use of spring-seeded cover crops and their ability to improve farm profitability. This research project evaluated the performance of three species (crimson clover, berseem clover, and chuckling vetch) for use as an N source for vegetable crops. The cover crops were compared to a no N input system and a non N limiting rate of manure utilizing a randomized block design. Soil samples were collected on a weekly basis starting at the first plow down date. We used standard soil extractions and colorimetric methods to quantify soil nitrate amounts. This data will be used to develop recommendations for selection and management of spring-seeded cover crops.

LATINO PARENTS OF CHILDREN WITH SPECIAL HEALTHCARE NEEDS

Jennifer Nitschke, Jocelyn Yale, Lori Anderson (Mentor), Nursing

School-age youth bring a variety of health-related needs into the classroom. A number of these children with special health care needs (CSHCN) are Latino. Previous research has found families have difficulty communicating with school and advocating for their child. In Latino families language and cultural differences amplify difficulties. Little research is available on Latino parents' experiences regarding healthcare of their CSHCN at school. The purpose of this study was to describe Latino parents' experiences with care of their CSHCN in school settings. Data were collected during standardized, open-ended, one-on-one interviews with Latino parents of CSHCN in Wisconsin. Content analytic techniques were used to analyze data and identify themes. Describing and understanding experiences of Latino parents of CSHCN is important to developing culturally appropriate supportive interventions.

THE STEINBRENNER WAY: LIKE FATHER LIKE SON

Zachary Noble, Debra Holschuh-Houden (Mentor), Family Business Center

This project will delve in to the life and family of George Steinbrenner III in order to understand how he took the New York Yankees from rags to riches. Although an inspiring story, many industry professionals have accused George of playing unfairly without regard for even those closest to him. In fact, this was proven to be true in many cases and resulted in severe punishment from the league. Furthermore, I will analyze where the franchise is headed now that George has passed it on to his two sons, Hank and Hal. George was a man of many words, and for that reason, there is an abundance of articles, biographies, and documentaries that I will use to study the relationship between father and sons. I expect to find that George's father Henry had a profoundly similar attitude in conducting business with an iron fist and that he passed it on to his son. I remain skeptical in believing George's son, Hank and Hal Steinbrenner, have what it takes to fill the void left by 'The Boss.' Their lack of preparation can be attributed to George's ego, which got in the way of his sons' development and the succession process. For this reason, Hank and Hal are better suited as owners without operating responsibilities. If the brothers are unable to adjust quickly, the most storied franchise in sports history could be on its way down.

EVALUATING EMISSIONS SOURCES WITH SATELLITE NO₂ OBSERVATIONS

Jacob Oberman, Erica Bickford, Matt Luedke,
Claus Moberg, Steve Plachinski, Tracey Holloway (Mentor),
Sustainability and Global Environment

Nitrogen dioxide (NO₂) plays an important role in the atmospheric formation of tropospheric ozone, a health-damaging air pollutant. The relatively short atmospheric lifetime of NO₂ leads to elevated ambient concentrations near sources, allowing for evaluation of emissions from satellite-measured NO₂ columns. In particular, the Ozone Monitoring Instrument (OMI) aboard NASA's Aura satellite measures NO₂ at resolutions fine enough to resolve individual roadways and point sources. In this study, we employ OMI NO₂ observations to better understand spatial and temporal patterns in emissions. Our focus is on regional-scale spatial variation, which is difficult to assess from ground-based observational systems. We consider the ratio between weekday and weekend emissions as an indicator of anthropogenic influence, and assess potential correlations with population density and traffic patterns.

A NOVEL GENE CLUSTER REGULATES QRR1, A CONSERVED COMPONENT OF THE VIBRIO QUORUM-SENSING NETWORK

Dane Oehlert, Timothy Miyashiro (Mentor),
Medical Microbiology and Immunology

Vibrio fischeri is a bioluminescent bacterial symbiont of the Hawaiian squid, *Euprymna scolopes*. Within the host, *V. fischeri* uses quorum sensing to regulate bioluminescence according to local cell density. Previously, we have shown that the small RNA Qrr1, which is conserved among all vibrios, represses bioluminescence in *V. fischeri*. In this study, we conducted a genetic screen to identify regulators of the *qrr1* gene. From this screen, we identified a novel gene cluster that activates *qrr1* expression. Over-expression of these genes also leads to low levels of luminescence and a colonization defect. Furthermore, we have shown that expression of this gene cluster affects quorum sensing in other vibrios, including *V. cholerae*. Our findings highlight a novel component of the vibrio quorum-sensing network.

THE ROLE OF INFECTIOUS DISEASES IN THE DECLINE OF GOLDEN-WINGED WARBLERS

Yushi Oguchi, William Karasov (Mentor), Forest and Wildlife Ecology

I report the results of the first immunological tests in the Golden-winged Warbler (*Vermivora chrysoptera*) X Blue-winged Warbler (*V. cyanoptera*) hybridization complex. The study intended to investigate whether *V. cyanoptera* or hybrids could have superior immunity over *V. chrysoptera*, contributing to the latter's displacement. Blood samples were collected from breeding *V. chrysoptera*, *V. cyanoptera*, and their hybrids in Central Wisconsin to compare natural antibody activities and white blood cell counts. Thus far, I found no significant differences in natural antibodies among these species and their hybrids. Although differential immune quality may not be a factor for the displacement per se, the comparable performance of hybrids relative to the parent species may provide additional support to the scenario that hybridization could continue where these species co-occur.

ANXIETY AND DEPRESSIVE DISORDERS IN ADOLESCENTS WITH ATOPIC DERMATITIS

Nicole O'Keefe, Rachael Holmes, Elliott Paletz,
Marcia Slattery (Mentor), Psychiatry

Studies suggest that atopic dermatitis (AD) is associated with increased symptoms of anxiety and depression. No studies, however, investigate the prevalence of anxiety/depressive disorders in youth with AD, and potential risk factors associated with the development of these psychiatric illnesses. Thirty-five adolescents with AD were evaluated for psychiatric disorders. Subgroups were compared on demographic, medical, and psychiatric symptom variables. Rates of anxiety disorders were higher than community estimates. AD adolescents with anxiety had more itching; those with both anxiety and depression had significantly lower socioeconomic status and lower dermatologic quality of life, compared to those without anxiety or depressive disorders.

MITOCHONDRIAL ATP-SENSITIVE POTASSIUM CHANNELS PROTECT AGAINST MYOCARDIAL ISCHEMIA

James Oldeschulte, David Oldeschulte,
Jonathan Makielski (Mentor), Cardiology

Sulfonylurea receptors-2A (SUR2A) and its gene variants are the regulatory subunits of the mitochondrial ATP-sensitive K⁺-channels that protect hearts against ischemia. We studied the role of SUR2A-55, a novel SUR2A variant in mitochondria, towards cardioprotection. Live mitochondria were isolated from mouse heart and, using fluorescence assays, the membrane potential (Mv) and tolerance to Ca²⁺ were determined. Transgenic mice over-expressing SUR2A-55 (Tg), had partially depolarized Mv [7.2±0.6% afu in Tg vs 10.3±0.7% afu in control mice (Wt); p <0.05] and, were more resistant to Ca²⁺ (40uM in Tg vs 30uM in Wt; p<0.05). The partially depolarized Mv and tolerance to Ca²⁺ are indicative of cardioprotection with increased SUR2A-55 expression.

“UN AMOUR DE DÉPENDANCE”: REFLECTIONS ON THE CHALLENGES OF WRITING A SHORT NOVEL IN LE PASSÉ SIMPLE

Cody Olson, Florence Vatan (Mentor), French and Italian

In this independent project, I immersed myself in the French language and challenged my writing skills by writing a short novel in *le passé simple*. Le passé simple is a literary tense that is no longer taught to students learning the French language. Writing a short story in a foreign language in a tense that is not used in French conversation presented challenges that manifested quickly. This project provides insight into these challenges and reflects on the transition away from using *le passé simple* in modern French literature.

SEXUAL ORIENTATION: THE NEXT SUSPECT CLASSIFICATION?

Cody Olson, Howard Schweber (Mentor), Political Science

Suspect classification: an identification of a class that has been “subjected to such a history of purposeful unequal treatment, or regulated to such a position of political powerlessness as to command extraordinary protection from the majoritarian political process (San Antonio School District v. Rodriguez, 1973).” Presently in the midst of a gay rights movement, the United States Supreme Court could potentially hear cases that would challenge the way the court classifies sexual orientation. In *Perry v. Schwarzenegger* (2009), Chief Judge Vaughn Walker argued, “All classifications based on sexual orientation appear suspect.” This research attempts to dissect the history and purpose of this classification to determine the legal and political validity of whether sexual orientation should be considered a suspect classification.

ROLE OF ETC COMPLEX IV ON INFLUENZA SUPPRESSION

Katherine Omernick, Linhui Hao (Mentor),
Institute for Molecular Virology

To effectively treat and control the spread of influenza, more must be known about the viral-host interactions of viral infection mechanisms. In a recent study, our group found that influenza type A requires the host gene COX6A1, which encodes the protein complex IV of the mitochondrial electron transport chain. When complex IV was chemically inhibited in host cells viral proliferation was significantly suppressed, while under the same condition, the energy levels of the cell did not decrease. To determine whether either viral transcription (mRNA production) or replication (cRNA and vRNA production) is being blocked, this study will utilize QPCR to compare the influenza vRNA, mRNA and cRNA levels in influenza virus infected cells between complex IV inhibited cells and untreated cells.

ENZYME STRUCTURE AND FUNCTION

Jose Orihuela, Sarah McDaniel (Mentor), Library

Enzymes serve as catalysts in chemical reactions. Along with conventional graphs and definitions, this video tutorial uses real-life examples in order to describe the function and structure of enzymatic reactions in the body. This tutorial also breaks down enzymatic reactions into the categories of competitive and non-competitive inhibition. The purpose in creating this video is to serve as an aid in the biology learning process.

POSSIBLE SELVES

Kristin Orłowski, Kyle Miller, Donny Riles, Janean Dilworth-Bart (Mentor),
Human Development and Family Studies

This study explored how mothers' school-related identities influence their current expectations of possible identities for their children. Forty mothers of preschool aged children participated in semistructured interviews on their school-related history and children's school preparation. By applying a possible selves framework, thematic analyses revealed two main themes, the feared self and the desired self. The feared self included maternal fears that their children would be an alternative learner, dropout, or social outcast, while the desired self included becoming an honor roll or well-rounded student. This study suggests that mothers' recalled school identities guide their evaluations of children's possible selves in early childhood. Implications for early childhood personnel are discussed.

PREDICTING ADOLESCENT ANXIETY FROM MEASURES OF ATTENTIONAL CONTROL

Deirdre O'Sullivan, H. Hill Goldsmith (Mentor), Psychology

Anxiety is a prevalent psychiatric disorder during adolescence that is correlated with difficulties in flexibly allocating attention and possibly other aspects of cognitive processing. We sought to highlight the role of difficulties in attentional allocation in predicting anxiety by controlling for individual differences in working memory, spatial working memory, and vocabulary as well as age and socio-economic status. Participants were 316 twins aged 12–16 years. Data were obtained from caregivers, the twins themselves, and observers who visited the home. Multiple regression analyses showed that the attention measure significantly predicted four aspects of anxiety (general anxiety, social anxiety, separation anxiety, and obsessive compulsive symptoms). Use of the twin design will allow an examination of whether the association of attention with adolescent anxiety has a genetic basis.

WHY TODDLERS LOVE ELMO: AN EYE-TRACKING STUDY OF LEARNING FROM VIDEO

Jacqueline Oswald, Abbey Eckhoff, Jennifer Franke, Luke Hinrichsen, Heather Kirkorian (Mentor), Human Development and Family Studies

The purpose of this study is to examine if character familiarity has an impact on the way children watch and learn from video. We hope to replicate the finding that children will learn better from familiar characters rather than an unfamiliar character. Some children watched a video of Elmo or of DoDo, a Taiwanese character, modeling actions with toys. Other children played with the toys without watching a video. While the children watched, an eye-tracker determined where they were looking on the screen. The children were then allowed to play with the toys. Videos are currently being coded and will be completed this semester. These findings will help demonstrate if toddlers look at different things and behave differently when a familiar character is presented.

EVALUATION OF NUTRITION, EDUCATION AND WATER PROJECTS IN UGANDA FOR ACCOUNTABILITY AND EFFICIENCY

Mollie Overby, Aneela Alamgir, James Ntambi (Mentor), Biochemistry

In January 2011 the Village Health Project in collaboration with its community partner, Community Based Integrated Nutrition (COBIN), conducted an evaluation of clean water and Maka menstrual pad projects that Village Health Project has developed in rural Uganda. The evaluation included water quality testing and interviews with Ugandan community members who had benefited from water tanks, biosand water filters or Maka menstrual pads. The data collected will be used to modify and strengthen existing projects and to provide insight into the future direction of Village Health Project and COBIN.

EFFECT OF TIMING OF STEM CELL IMPLANTATION IN A STROKE MODEL

James Palmer, Matthew Jensen (Mentor), Neurology

Stroke is the third leading cause of death in the United States, and many patients who survive are debilitated for life. The overall focus of my research is to save and improve the lives of stroke patients via neural cell regeneration in vivo in rat models. We are doing this by stem cell implantation and subsequent in vivo differentiation. Stem cell research thus far has shown great promise in the ability of stem cells to increase recovery from strokes. My research involves determining which time period for stem cell implantation post-stroke leads to the optimal recovery. Our hypothesis is that the sooner stem cells can be implanted, the more complete the recovery process will be.

ARE WE FACEBOOK OFFICIAL? LINKS BETWEEN DATING PARTNERS' FACEBOOK CONFLICT AND RELATIONSHIP DISPUTES

Laura Pantaleo, Shannon Schlack, Jennifer Danielewicz, Lauren Papp
(Mentor), Human Development and Family Studies

Facebook has become such a revolution that it is now entering people's lives and affecting them in more ways than ever thought possible, potentially even underlying disagreements in romantic relationships. The data for this study were drawn from research conducted to investigate the interplay between couples' relationships and partners' health and well-being. As part of this research, 59 dating couples participated in a two-part laboratory session, which included multiple questionnaires. Specifically, a questionnaire regarding the Facebook was administered to couples to assess their relationship status, amount of time spent using the website, specifics about their profile picture, and conflict and satisfaction related to Facebook. Partners' demographic information as well as measures of commitment, relationship satisfaction, and attachment were also obtained. From this data, we suspect that there will be a relationship between conflict on Facebook and conflict in couples' relationships, including with regard to partners' decisions to include a relationship photo on their profile. We further predict that partners' Facebook use will be positively correlated with their levels of relationship satisfaction, commitment to their relationship future, and secure attachment to their partner.

MORPHOLOGICAL ANALYSIS OF AN ACIDOPHILIC BISPORA SP. AND ITS BACTERIAL SYMBIONT

Daniel Parrell, Charles Kaspar (Mentor), Bacteriology

An acidophilic mold (*Bispora*) and its mutualistic bacterial partner were isolated from the Richmond mine in California. Ongoing studies have investigated the growth of *Bispora* and its symbiont including the conditions triggering spore formation by the mold. Over a range of temperature and pH, changes in *Bispora* morphology, spore formation, and numbers and location of the bacterial symbiont were determined. Growth at low-pH (i.e., pH 1.0) on solidified potato dextrose agar resulted in spore production. Numbers of the bacterial symbiont increased during culture at pH2 at 18C. Also, *Bispora* excreted or accumulated liquid on arial hyphae. This liquid is being investigated as a reservoir of the bacterial symbiont. Identification of the bacterial symbiont by amplification of the 16s rDNA gene is in progress.

VANCOUVER

Danielle Patlak, Thomas Berenz (Mentor), Art

In my work, I wanted to examine the contrast between natural and urban elements. I focused on rooftop gardens and how people are taking nature and bringing it into the city. Trees are such permanent fixtures and seeing them living in a fast-paced world that places an emphasis on the fleeting and the temporal is an incredible juxtaposition. These rooftop gardens are a way for city-dwellers to feel like they are offsetting some of their negative environmental impacts, while at the same time, finding a way to be reconnected with nature, a healthy and necessary connection.

THE EFFECTS OF FOLIC ACID SUPPLEMENTATION ON REPAIR OF THE CENTRAL NERVOUS SYSTEM OF CD-1 MICE

Joy Pehler, Bermans Iskandar (Mentor), Neurological Surgery

It was once thought that the injured adult central nervous system (CNS) could not regenerate axons, due to inhibitory molecules or the incorrect growing environment. However, studies targeting the molecular constituents of injured neurons have shown that under appropriate conditions, CNS axons can grow and heal. In our laboratory, Iskandar et al. have shown that folic acid supplementation aids in the regeneration of the injured adult rat CNS through an effect on DNA methylation. Using the same methodology, we would like to prove the effectiveness of folic acid supplementation on the regeneration of the injured CNS of in mice. Providing evidence that such an effect is not species-specific would confirm the universality of these results in the mammalian CNS and lend important mechanistic value.

CHILDREN'S PERCEPTIONS OF BEHAVIORAL SEQUENCES

Jordynn Peter, Charles Kalish (Mentor), Educational Psychology

We are analyzing moral and cognitive development in preschool-aged children. Our question is how young children distinguish between atypical actions that do and do not violate various kinds of norms or rules. Children are shown short video clips. Videos represent four categories: incompetent, dangerous, mean, and weird. Children evaluate the videos along a number of dimensions: for example, should the person be punished? We are asking how children come to differentiate among the many ways an action can be 'wrong.' Of particular interest are actions that are unusual, but, from an adults' perspective, do not actually constitute violations. We hypothesize that young children might deem all non-standard actions as wrong, and may tend to apply moral evaluations to a wide range of violations.

CORRELATION OF RESTING STATE FUNCTIONAL CONNECTIVITY WITH RAVENS MATRICES PERFORMANCE

Molly Peterson, Timothy Meier (Mentor), Medical Physics

Previous studies on functional connectivity in cognition demonstrate a strong correlation between prefrontal and parietal regions of the brain during intelligence-related tasks. Little, however, is known about whether spontaneous brain activity in the resting state is related to differences in intelligence. The goal of the present study was to determine if resting state functional connectivity in the prefrontal cortex is able predict fluid reasoning skills. We used linear regression analysis to investigate individual differences between RAPM score performance and the brain-wide connectivity of two seed regions in the right and left rostrolateral prefrontal cortex, areas that have been previously linked to fluid reasoning. The results of this study will enhance our knowledge of whether individual differences in intelligence are reflected in resting state functional connectivity.

CREATING A MARMOSET MODEL FOR ADOLESCENT OBESITY: HORMONAL AND BEHAVIORAL CONSEQUENCES

Laura Peterson, Charles Snowdon (Mentor), Psychology

Obesity is a global problem, particularly among children and adolescents, with severe physical and physiological consequences. We are creating a marmoset monkey model for obesity. Our objective was to compare the behavioral and hormonal changes of overfed males with control counterparts. For three months, eight monkeys were fed a 50% calorie increase. Behavioral observations were taken to assess changes in the monkeys' physical activity, social interactions, and individual engagement. Urine was collected over four months and will be analyzed for metabolic hormones. Preliminary results confirm behavioral changes among overfed monkeys. Despite the small sample size and the relatively short study period, these results may enable further biomedical research to utilize the marmoset model as a reliable tool to further our understanding of adolescent obesity.

CHARACTERIZATION OF DEMINERALIZED BONE MATRIX AND EVALUATION OF HUMAN MESENCHYMAL STEM CELL RESPONSE

Zachary Pflum, Wan-Ju Li (Mentor), Orthopedics and Rehabilitation

Used clinically to regenerate bone, demineralized bone matrix (DBM) has been demonstrated to induce osteogenesis *in vivo*. However, the mechanism through which DBM regulates the osteogenic differentiation of human mesenchymal stem cells (hMSCs) is unknown. Further understanding of the osteogenic properties and processes of DBM *in vitro* may provide the insight into the performance of DBM *in vivo*. Exploring the effects of the soluble factors and the mechanism by which these factors mediate differentiation of hMSCs is essential to the understanding of DBM-mediated bone regeneration. The specific aims of this study include characterizing the differentiated cells from MSCs, identifying the soluble factors and ions that mediate the effects, and determining the role of the soluble factors in the DBM-mediated differentiation of hMSCs.

PREFERENTIAL INTERACTIONS EFFECTS ON DNA HAIRPIN FORMATION

Chau Phan, M. Thomas Record Jr. (Mentor), Biochemistry

Protein and DNA complexes are stabilized by non-covalent interactions between chemical functional groups on the biopolymers, which must compete with hydration water to interact. In the unfolded state, these interactions are replaced by interactions with hydration water and intracellular osmolytes, small solutes produced by cells to enhance protein and nucleic acid stability in response to environmental stress. Solute affect DNA stability through non-covalent interactions with the DNA surface exposed upon unfolding. Here, we study the stability of a twelve nucleotide DNA hairpin as a function of concentration of different alcohols and interpret the data in terms of interactions between the functional groups on the solute and the DNA bases.

SPATIAL AND TEMPORAL DIVERSITY OF METHANOTROPHS IN NORTH TEMPERATE LAKES

Kelsey Phillips, Katherine McMahon (Mentor),
Civil and Environmental Engineering

In order to address the issue of methane accumulation in the atmosphere, more research is needed regarding methanotrophs, the bacteria that consume this greenhouse gas. Wisconsin lakes contain a wide variety of these methanotrophs, and studying them will provide insight into their diversity and distribution both spatially and temporally. To describe methanotroph diversity across a regional landscape, we performed T-RFLP analysis of *pmoA* genes across five different lakes, followed by analysis using non-metric multidimensional scaling. To further characterize methanotroph diversity, we performed sequence analyses of the *pmoA* gene recovered from several samples from three of these lakes. Our results contribute to a broader understanding of how these microbes may contribute to global climate change.

CHARACTERIZATION OF ENDOMETRIOTIC CELL BEHAVIOR USING A 3D CULTURE MODEL

Kathryn Pollock, Pamela Kreeger (Mentor), Biomedical

Endometriosis affects 15% of women. This disease causes cyst formation on surfaces in the abdominal cavity causing pain and infertility. Endometriosis is poorly understood, and the long term goal of this research is to characterize endometriotic cell behavior using a 3D culture model. My project specifically focuses on the initial steps of this characterization, including optimization of culture conditions, staining, and procedure troubleshooting. Eventually, the conditions optimized in these experiments will be used to co-culture endometriotic cells with macrophages to simulate inflammation, and cellular responses will be quantified with proliferation assays. Ultimately, the information gleaned from this research will contribute to improving treatment plans for women with this disease.

BIRTH OF A NEW ERA

Alexandra Port, Sophia Flood (Mentor), Art

In depicting the “new age” or “new world,” this piece illustrates birth of a new era. I began with an egg, a symbol for the sacred and birth, that had just been broken to reveal a city formed from a mass of intricate parts. Gears make the city mechanical, but it is also organic in feel with lines of tubing. Squirming and wriggling, the city seems growing, yet it hasn’t breached the outer rim of the egg. The city’s destiny is undecided. It could take the egg over or remain peaceably cloistered within the shell. This image relates to the “new age” both physically and mentally. The machine age is truly coming to fruition as machines and synthetics enhance the human body and experience. This isn’t the only type of machine present within the world. I consider the egg as a microcosm for the greater world at large, in which something that is growing out of control is glorified, rightly or not.

DIFFUSION TENSOR IMAGING: COMPARING THE UNCINATE FASCICULUS IN ANXIOUS AND HEALTHY SUBJECTS

Frank Prado, Jack Nitschke (Mentor), Psychiatry

The central core of the brain, or the white matter, is comprised of large bundles of nerve fibers. Diffusion tensor imaging is a new form of magnetic resonance imaging (MRI) that provides information about the white matter. One fiber tract, known as the uncinate fasciculus (UNC), is of special concern. By using a computer tractography program we are able to isolate the left and right UNC’s and view multiple datasets. In my study, we are discovering that humans with generalized anxiety disorder (GAD) consistently exhibit less structural integrity in their UNC’s compared to individuals who have no anxiety. Through this possibly significant finding we are coming closer to understanding the connectivity of the human brain, and how neuroplasticity can effect or cause GAD.

DYRDEK ENTERPRISES

Corey Pratt, Debra Holschuh-Houden (Mentor), Family Business Center

This project will attempt to analyze the unique family dynamics of Dyrdek Enterprises and their success in a wide range of industries including sports and entertainment. In my research I will explore the unique ability of Dyrdek Enterprises to build a brand around an entire family and sell a lifestyle. I will begin by dissecting Rob Dyrdek's, founder and CEO, success in transforming a professional skateboarding career into a multimillion dollar brand that spans a wide range of industries. Secondly I will dissect the incorporation of his two cousins and how they were able to expand their brand to incorporate their abilities through the use of modern media and marketing techniques. I expect to find a unique and strong family dynamic that allows Dyrdek Enterprises to be efficient and think creatively. Also I expect to find that their success is dependent on the use of modern social networks such as Facebook, Myspace, and Twitter.

A TIME DEPENDENT ANALYSIS OF THE ARRIVAL DIRECTION OF COSMIC RAYS USING THE ICECUBE NEUTRINO OBSERVA

Craig Price, Paolo Desiati (Mentor), Astronomy

Using IceCube, a large particle detector located under the surface of the South Pole, we studied the cosmic ray plasma that surrounds the Earth. Specifically, we observed the change in frequency of incoming cosmic rays depending on the relative motion of the Earth around the Sun. The complicating factor in this analysis is to determine the interference between Earth's revolution around the Sun and any extra-terrestrial source of cosmic rays. We present evidence that in the energy range IceCube is sensitive to, there are exactly two sources of cosmic rays: an excess of cosmic rays due to the motion of the Earth, and a combination of a maximum flux of cosmic rays at 100 degrees Right Ascension, and a minimum flux at 220 degrees.

THE UNEXPECTED DEATH OF AN ENTREPRENEUR

Benjamin Purman, Debra Holschuh-Houden (Mentor),
Family Business Center

This project will attempt to understand more about the death of an entrepreneur in a family business. I will research two categories: preparing before a death and coping in the aftermath of that death. Planning to interview family businesses, I will find answers as to how real businesses deal with an unexpected entrepreneur's death financially, socially, skillfully, among other things. I will also do literary research on how to prepare and cope with an untimely death of a family business leader. Preparing and dealing with an entrepreneur's death must be a large part of family business ownership and I expect to find that it is extremely difficult to replace an entrepreneur in a business setting. Therefore, this project will further help prepare and cope with this situation.

THE EFFECTS OF ERYTHROPOIETIN ON TRANSFERRIN RECEPTOR CONCENTRATION IN NEWBORN RAT INTESTINAL TISSUE

Alex Quilling, Pamela Kling (Mentor), Pediatrics

Transferrin, a protein that transports iron, is found in the small intestine and is critical to iron metabolism in mammals. Concentrations of transferrin and its receptor may be influenced by erythropoietin, a hormone found in milk that stimulates iron usage in red blood cells. This experiment is designed to examine how transferrin and transferrin receptor concentrations in newborn rats are affected by ingested doses of erythropoietin. Both iron-deficient and normal rats will be treated with erythropoietin or control treatment for twelve days following birth. Concentrations of blood transferrin and intestinal transferrin receptor will be measured. Our hypothesis is that transferrin and transferrin receptor concentrations will be greater in both iron-deficient and normal rats that are fed erythropoietin in milk, and preliminary results indicate as such.

ROLE OF MEDICAGO TRUNCATULA HMGR1 IN ARBUSCULAR MYCORRHIZATION

Daniel Ramberg, Dhileepkumar Jayaraman (Mentor), Agronomy

NORK or DMI2 (Doesn't Make Infections-2) is a plasma membrane bound receptor-like kinase that plays a role in arbuscular mycorrhiza signaling pathway between fungi of the phylum Glomeromycota and host plant *Medicago truncatula*. In this symbiosis, the fungi allow an increased uptake of nutrients, especially phosphorus, for the plant from the soil. NORK interacts with the enzyme HMGR1, and this interaction is essential for a related symbiosis, nodulation, which shares a similar signaling pathway. This study uses RNA interference (RNAi) to knock out expression of HMGR1 to determine if HMGR1 is crucial for mycorrhization in *Medicago truncatula*. Preliminary results have indicated that RNAi mutants have decreased levels of mycorrhization.

HOW HUMANLIKE ROBOTS MIGHT USE GAZE CUES EFFECTIVE IN THEIR INTERACTIONS WITH PEOPLE

David Ramirez, Bilge Mutlu (Mentor), Computer Sciences

My project specifically is working on how gaze affects people and their interaction with robots. Our team has created an experiment in which we manipulate the robot's gaze behavior in four conditions. There are four separate scenarios with gaze in order to see how people respond. We measure people's responses to variations in the robot's gaze behavior to develop guidelines for robot design. Our preliminary results show that when the robot looks away people feel more comfortable getting close to the robot. The results of our experiment will inform future design of more socially responsive robots.

UNDERSTANDING THE DECISION MAKING PROCESS USING FRUIT FLIES' RESPONSE TO LIGHT AND CITRONELLA

Monika Ramnarayan, David Nelson (Mentor), Biochemistry

The main purpose of our project is to understand how the brain makes decisions. At this point, we know that the body feels something and sends a message to the brain, resulting in a response. However, we are unsure about the exact way in which this happens. In order to completely comprehend this process, we are using fruit flies and observing their responses to something they like (light) and something they do not like (citronella) in a warm environment. Flies that cannot decide what to do will be kept for further study. We hope that our fly results will help us understand how the human brain works.

AGING IS REGULATED BY REPRODUCTIVE HORMONES IN CAENORHABDITIS ELEGANS

Caitlin Rau, Craig Atwood (Mentor), Geriatrics and Gerontology

The reproductive-cell cycle theory of aging proposes that reproductive hormones regulate longevity. A hypothalamic link between aging and reproduction and its mechanism is currently unknown. There have been two orthologues to human gonadotropin-releasing hormone receptors (GnRHR) identified in the model organism *Caenorhabditis elegans* (Ce-GnRHR1 and Ce-GnRHR2). Our preliminary studies show that egg-laying is delayed and decreased in Ce-GnRHR1 deletion mutant worms (RB509), while treatment of these worms with anti-Ce-GnRHR2 oligonucleotides significantly enhances this delay and decrease in reproduction. Importantly, suppression of Ce-GnRHR2 signaling in RB509 worms with antisense significantly increases *C. elegans* lifespan. Using Ce-GnRHR2 deletion mutant worms (RB2596) and suppressing Ce-GnRHR1, early results are showing similar findings of delayed and decreased reproduction in addition to increased lifespan.

WHEN SHOULD ROBOTS INTERRUPT? DETECTING HUMAN INTERRUPTIBILITY USING NEURAL SIGNALS

Rehman Ur Rauf, Bilge Mutlu (Mentor), Computer Sciences

Social robots and agents do not have the ability to sense the concentration/ involvement level of a person they are interacting with, which sometimes leads to interruption by robot at undesired time. Our research goal is to develop a measure for human engagement and interruptibility, measured by an electroencephalograph (EEG) that gives an indication of the concentration level of the brain, which will help us in determining a suitable time for interruption of humans by a robot. Toward developing a robust measure of engagement, we are currently experimenting with different EEG sensors and indices. Our work will have significant implications for designing technology, particularly intelligent interactive systems for the workplace.

THE EFFECTS OF ENDOGENOUS 3-IODOTHYRONAMINE ON APPETITE AND WEIGHT IN MICE

Hannah Reiland, Fariba Assadi-Porter (Mentor), Biochemistry

3-iodothyronamine (T1AM) is an endogenous compound that appears to have effects opposing those of the thyroid hormone. Treatment with exogenous T1AM has been found to decrease carbohydrate metabolism, heart rate, and temperature. This study monitored body weight and food consumption following administration of low levels of T1AM (10 mg/ml) in slightly obese mice. A significant weight loss was associated with T1AM administration on a high-calorie diet despite no apparent changes in food consumption. After cessation of T1AM treatment, mice regained only part of the lost weight in the following weeks, indicating long-lasting effects of this natural molecule. Metabolic switching leading to lipid mobilization by T1AM may provide a new opportunity for development of this endogenous compound as an effective human weight-loss drug.

GENERATION OF NANOTOPOGRAPHIES ON POLYMER SUBSTRATES BY COLD PLASMA

Brian Resch, Sorin Manolache (Mentor), Engineering Physics

The modification of plastic and polymer surfaces is a growing field in manufacturing sciences, chemistry and physics. Cold plasma may be used to produce nanotopographies on polymer surface. These topographies can produce super-hydrophilic, super-hydrophobic or anti-scratch properties. We placed polymer substrates in a vacuum chamber, filled with gas plasma and under an electrical charge, and produced topographies necessary for the polymer to have these properties. Our research studies the different topographies produced by three gasses, argon, oxygen and hydrazine, under three different voltages. Our findings should indicate that different properties will be produced depending on the gas plasma and voltage used. The topographies produced may drastically change both the methods of production as well as the utility of polymers in everyday life.

STUDY OF THE GENETIC AND BIOCHEMICAL PATHWAYS IN A NEUROLOGICALLY IMPAIRED D. MELANOGASTER STRAIN

Alexandra Rezazadeh, Barry Ganetzky (Mentor), Genetics

This project stems from the observation of characteristic behaviors in a strain of fruit fly. These behaviors are concerned with deficient motor skills, including: shortened flight endurance, limited crawling ability, and shortened lifespan in high temperature, probably reflecting failures in the central nervous system. To determine the cause of these defects, I am performing the following experiments: larval dissections to study their neuron patterns, pain sensitivity tests, and quantification of larval crawling ability. All tests and data will be compared to that of a wild-type strain. These experiments may provide insight into new genes and pathways involved in nervous system function, and the resulting data could provide medical techniques that suppress such neurological phenotypes present in human neurological diseases.

ONGOING STUDY ON THE EFFECTS OF LAKE MARION DAM ON BLACK EARTH CREEK

Kirsten Rhude, Janet Batzli (Mentor), Institute for Biology Education

The Wisconsin DNR is requiring the Village of Mazomanie to remove or repair the Lake Marion Dam on Black Earth Creek in western Dane County. Generally dams have a negative effect on stream health and biodiversity, as they block stream flow, raise water height, slow stream velocity, and allow sediment to settle upstream. I performed a systematic observation of water quality surrounding the Lake Marion Dam to determine baseline conditions before dam removal. Two sites upstream and two sites downstream of the dam were monitored for four weeks. Observations included temperature, dissolved oxygen and biological oxygen demand, turbidity, and macroinvertebrate surveys. Results suggest that dam removal will not have a significant impact on overall stream health, but only localized effects.

WOMEN'S CONTRIBUTIONS TO ANCIENT WARFARE

Naomi Ripp, Nam Kim (Mentor), Anthropology

My project looked at various contributions women made to warfare in past cultures. I did not focus on just one area, but included examples from different parts of the world including: The U.S., the Middle East, China, and Eurasia. The contributions mentioned involved both material contributions like food and supplies as well as active participation on battle fields.

NIKETAS CHONIATES IDEAL WOMEN

Naomi Ripp, Leonora Neville (Mentor), History

My project used previously established ideals of proper behavior for a woman in the medieval Byzantine empire to examine 12th century historian Niketas Choniates' history to find what his idea of what an ideal proper woman would be. I especially used the "bad women" he portrayed to determine what his idea of good woman would be.

EFFECTS OF ACUTE GRAFT-VERSUS-HOST DISEASE ON PSYCHOLOGICAL AND PHYSICAL WELL-BEING

Samantha Risch, Kathryn Schmidt, Erin Costanzo (Mentor), Psychiatry

Acute graft-versus-host disease (aGVHD) is a complication of hematopoietic stem cell transplantation (HSCT) that is associated with significant morbidity and mortality. We examined the impact of aGVHD on emotional, physical, and functional well-being. Individuals undergoing HSCT (N=93) at the UW Cancer Center completed measures of psychological symptoms and physical and functional well-being at 3 and 6 months post-transplant. ANOVA was used to compare patients who developed aGVHD (28%) to those who did not on each measure. Individuals with aGVHD reported more anxiety symptoms at 3 months post-transplant ($F(1,84)=4.71, p=.03$) and poorer physical and functional well-being 6 months post-transplant ($F(1,84)=4.41, p=.04$; $F(1,84)=3.82, p=.05$). There were no significant differences in depression. Interventions targeting psychological and quality of life sequelae of aGVHD may improve health outcomes following HSCT.

STING REGULATES IFN- α EXPRESSION DURING ENDOPLASMIC RETICULUM STRESS

Daniel Rivera, Judith Smith (Mentor), Pediatrics

STING, a stimulator of interferon genes found in the endoplasmic reticulum plays a vital role to the production of type I interferons against intracellular DNA infection. The process begins with the activation of TBK1 by STING, allowing for the phosphorylation of IRF3 that subsequently leads to interferon beta creation. Initial work by my mentors demonstrated synergistic induction of IFN- α mRNA in response to LPS/TPG and ER stress. Using just TPG resulted in nuclear translocation of IRF3 that implied a STING-independent pathway, while LPS/TPG in combination displayed IRF3 phosphorylation in a manner that depended upon STING. Therefore, the synergistic effects of the IFN- α responses during exposure involve STING-dependent IRF3 phosphorylation.

IMPROVEMENTS IN MOLECULAR BIOLOGY TECHNIQUES FOR RELIABLE IDENTIFICATION OF MUTATION IN CARDIAC RYANODINE RECEPTOR IN MICE

Daniela Robledo, Jonathan Hernandez (Mentor), Physiology

Catecholaminergic polymorphic ventricular tachycardia (CPVT) is a disease that manifests as sudden death. Caused by mutations in the cardiac ryanodine receptor (RyR2). Mice with mutations in RyR2 have been used as a model to understand the CPVT. Polymerase chain reaction (PCR) has been used in order to identify the mutations of the RyR2. Here we compare two DNA extraction protocols, sodium hydroxide (NaOH) and Chelex. DNA was quantified from each extraction by Agarose gel electrophoresis and tested by PCR. As a result, Chelex showed that it was twice as fast as the NaOH DNA extraction protocol and also displaying a better quality of DNA.

TRUST IN PATIENT-CLINICIAN COMMUNICATION

Sophie Rodrigues Pereira, Enid Montague (Mentor), Industrial Engineering

Trust in a physician is a strong constituent in the health care system and can influence a patient's health. The purpose of this research is to 1) determine the elements in a patient-clinician relationship that influence trust and 2) use these findings to design technologies that facilitate the formation of trust. We research this by coding or quantifying interactions in videos of patient visits based on verbal and nonverbal communication. We also code the interaction between the patient, clinician, and health information technologies to determine how technologies are used in technology-mediated health care encounters. Our study is still in progress, and we hope to isolate specific behaviors that encourage trust and ultimately engineer new technology that promote communication.

EFFECT OF SOIL FERTILITY ON ASPEN FORAGE QUALITY

Jessica Rubio, Kennedy Rubert (Mentor), Entomology

Declines in quaking aspen (*Populus tremuloides*) abundance in the Rocky Mountains have been linked to excessive browsing by deer. Browsing induces phytochemical changes in *P. tremuloides* which alters nutritional content, which may subsequently deter or entice herbivory. Using a common garden, this project examined the relationship between soil fertility and foliar nitrogen content of six strains of *P. tremuloides* in response to simulated deer browsing. Increased soil fertility as well as browsing were associated with elevated foliar nitrogen levels ($p < 0.05$), suggesting that prior browsing and elevated soil fertility may improve the quality of *P. tremuloides* foliage as forage material, making the plant more susceptible to subsequent herbivory.

MECHANICAL ANALYSIS OF ROTATOR CUFF TENDON TEARS

Kimberly Safarik, Ray Vanderby (Mentor), Biomedical Engineering

Tearing of rotator cuff tendons negatively impacts quality of life. More than 75,000 surgical repairs are performed annually but due to poor selection criteria, surgeries are often unsuccessful. This research aims to understand the mechanical effects of partial tears. We tested 36 sheep infraspinatus tendons, recording images of optical markers on the bursal surface of the tendon. Each tendon was tested without any tearing and afterwards with 3 depths of partial tear. Images of the tensile test were analyzed using Matlab. Average strain on the tendon was measured. We found statistically significant differences between strains of intact and torn tendons. This research will help doctors understand the mechanical effects associated with different types of tears in the rotator cuff tendons, which may improve surgical outcomes.

A UNIVERSAL PLATFORM FOR POLYPEPTIDE DELIVERY

Mary Sagstetter, Nate Cira, Peter Culviner, Nathaniel Pantalone,
Sarah Sandock, Justin Vrana, Yue Wu, Brian Pflieger (Mentor),
Chemical and Biological Engineering

Enzyme deficiency disorders, such as lactose and gluten intolerance, could be treated by supplying the therapeutic enzyme to a target within the digestive system. Our automated model system is a universal platform for polypeptide delivery designed to treat lactose intolerance by producing beta-galactosidase, a functional homologue of human lactase, in a bacterial chassis and releasing beta-galactosidase to metabolize lactose within the small intestines. Prior to ingestion, colonic acid production occurs to shield the bacteria from the stomach's acidity. Then, lysis occurs in the duodenum of the small intestine through one of three proposed systems: a timed inducible/repressible system, a bile induced system, or an encryption system. Delivery of different enzymes can be accomplished by exchanging one part in the universal platform.

THE HEAD SPECIFIC PROMOTER: ORP-1

Christopher Santeler, Que Lan (Mentor), Entomology

This research project entails finding the location of a critical gene (ORP-1), located in the head of mosquitos. It is under the supervision of Dr. Que Lan, who is an Associate Professor in the Entomology department at the UW. The ultimate goal of this research is to find a way to inhibit a certain gene in mosquitos, which is either directly or indirectly related to the survival of mosquitos. If this is done, mosquito related illnesses such as West Niles virus, malaria, and yellow fever prevalence would likely be greatly reduced. This research is ongoing, but strides are being made in Dr. Lan's lab.

A POTENTIAL THERAPY FOR ANDROGEN INDEPENDENT PROSTATE CANCER

Elizabeth Saphner, George Wilding (Mentor), Medicine

Prostate cancer is a leading cause of cancer death in the United States. After treatment, androgen-dependent prostate cancer reoccurs as androgen-independent cancer in one-third of patients; there are few therapies for this recurrent cancer. The progression from androgen dependent to independent is not completely understood, but the Wilding Lab has discovered that reactive oxygen species (ROS) are key in the progression pathway. They have also discovered a pathway for ROS production through polyamine oxidation, which is regulated by the formation of a complex between androgen receptor (AR) and the transcription factor JunD. It is hypothesized that prostate cancer progression may be prevented by inhibiting AR-JunD complex formation. One inhibitor has been identified and is being tested as a potential therapy to treat prostate cancer.

IDENTIFICATION OF NOVEL REGULATORS OF APOPTOSIS IN DROSOPHILA

Anne Sapiro, Arash Bashirullah (Mentor), Pharmacy

The ability of malignant cells to evade apoptosis is evident in nearly every cancer and is responsible for the inefficacy of many therapies. Despite its importance, the mechanisms conferring this ability are not well understood. My study provides new insight into the regulation of cell death in *Drosophila* through a novel regulator of apoptosis, *balsa*. In order to determine components of the *balsa* pathway, I conducted a genetic modifier screen to identify additional mutations that resist death. I found 38 complementation groups of which three map to known regulators of apoptosis, *dronc*, *diap1* and *deterin*. Most of the remaining groups map to regions without any previously described regulators of apoptosis. These experiments will help outline novel pathways that will expand our knowledge of cancers.

THE DYNAMICS OF ALTERNATIVE PUBLISHING IN XXI CENTURY ARGENTINA: A COMPARATIVE ANALYSIS

Sapir Sasson, Ksenija Bilbija (Mentor),
Latin American, Caribbean and Iberian Studies

In 2001, Argentina suffered a serious economic crisis. One of the major avenues affected by the collapse of the Argentinean economy was the traditional publishing industry. While some publishing houses shut down, others were unable to afford book imports from Europe and merged with other multinational conglomerates. Eloísa Cartonera, a non-profit publishing house that formed as a result of the crisis, purchased cardboard from street recyclers and used it to make affordable book covers; it also enabled young, emerging authors to publish their work despite the economic crisis. Through interviews and field research, my research evaluated the impact of Eloísa Cartonera on the alternative publishing market and examined the publishing dynamics among other independent Argentine publishers pre- and post-crisis.

NOVEL MURINE MODEL TO STUDY CHRONIC MYCOBACTERIUM TUBERCULOSIS INFECTION OF CENTRAL NERVOUS SYSTEM

Dashni Sathasivam, Zsuzsanna Fabry (Mentor),
Pathology and Laboratory Medicine

We are developing a small-animal model of brain tuberculosis (TB) to study the pathogenesis, neuroinflammation and immune responses in the central nervous system (CNS) during infection. The mice are systemically infected with a vaccine strain of mycobacterium tuberculosis (Mtb) that will be evaluated for infection. The criteria for a useful model are that all mice in a group will contract Mtb in the CNS tissue. Brain TB is a devastating manifestation of TB, primarily affecting young children and immunodeficient individuals. Therefore, primary candidates for contracting infection in our murine model are newborn and immunodeficient mice. We expect this model will help to better understand how and why Mtb disseminates to the CNS, thus facilitating the development of future therapeutic and preventive treatments for brain TB.

THE ROLE OF HIF IN THE ACTIVATION OF THE LATENT-TO-LYTIC SWITCH IN EPSTEIN-BARR VIRUS

Saraniya Sathiamoorthi, Janet Mertz (Mentor), Oncology

Epstein-Barr virus (EBV) is a human herpes virus which infects over 90% of the global population. Latent infection of EBV can result in lymphomas, Hodgekin's disease, and nasopharyngeal carcinomas. A viral gene, BZLF1 has a significant role in reactivating EBV to the lytic state (active form) necessary for transmission to other host cells. Through in silico analysis, DNA response elements for hypoxia-inducible transcription factors (HIF1, HIF2, and HIF3) were found in Zp, BZLF1's promoter. HIFs regulate the cell's adaptation to hypoxia, a condition caused by reduced oxygen concentrations. The purpose of this experiment is to determine if HIF1, HIF2, and HIF3 factors will activate the latent-to-lytic switch in the BZLF1 gene in the EBV virus.

THE TIMING OF ESTRADIOL-INDUCED GNRH RELEASE IN GT1 CELLS

Misa Sato, Ei Terasawa-Grilley (Mentor), Pediatrics

Estrogen is known to have both positive and negative feedback effects on the hypothalamic GnRH release. Although previously it was found that estradiol induced GnRH release within ten minutes, the exact time course of GnRH secretion following estrogen exposure is unknown. In this study timing of the estradiol-induced GnRH release was investigated by frequent sampling in the GnRH secreting cell line, GT1 cells. Results show that application of estradiol stimulated GnRH release with a latency of 2-12 min (average 8 min). Moreover, estradiol appears to increase the frequency of pulsatility.

TRANSCENDING PLACE: DYNAMIC LANDSCAPE IN THE MUSIC OF JOHN LUTHER ADAMS

Jessica Schallock, Brian Hyer (Mentor), Music

The music of composer John Luther Adams (b. 1953) is often inspired by the vast landscape of Alaska but transcends traditional notions of place in music. This paper explores the creation of the perception of physical space in Adams's work *The Light That Fills the World* (1999/2001) through a mapping of visual and temporal parameters to purely aural counterparts which represent a multi-dimensional space. A combination of score analysis, interviews with the composer, and synthesis of more abstract concepts of perception and sensation lead us to better understand this contemporary music as a powerful medium giving us new insight into our roles as listeners and as inhabitants of the ambient world.

INTERNET ADDICTION: SOCIAL NETWORKING SITES AND COLLEGE STUDENTS

Jessica Schanker, Megan Moreno (Mentor), Adolescent Medicine

As Internet use has grown, Internet addiction has become an increasing concern. The purpose of this study was to investigate students' views on Internet and Facebook use patterns by gender. University students (ages 17–18) completed a 25-question survey. Questions used a likert scale and evaluated Internet and Facebook addiction. All participants responded that the Internet can be addicting because they lose track of time and there is so much to do. Seventy percent of participants reported using social networking sites more than other web pages. Females had a higher overall score on the Facebook addiction items than males (14 ± 2.2) vs. (13.5 ± 1.4). Student's views on Internet tend to fit the criteria for addiction. Findings suggest females are more at risk for Facebook addiction than males.

EXPLORING HYDROGEN BONDING IN THE VIRULENCE FACTOR AND HEMOPHORE HASA WITH MODEL HEME-PHENOLATE COM

Matthew Scheske, Judith Burstyn (Mentor), Chemistry

Many gram-negative pathogenic bacteria release the HasA hemophore to scavenge and actively transport heme. The ability of these bacteria to obtain heme is essential to their virulence. In HasA, an unusual pair of axial ligands binds the heme iron (III) ion: a tyrosine (Tyr75) and a histidine (His32). This ligand pair has been observed in very few proteins. The Tyr75 oxygen forms at least one critical NH-O hydrogen bond with N δ 1 of the neighboring histidine, His83. This Tyr75-His83 interaction is conserved in all hemophores, suggesting that the Tyr75-His83 hydrogen bond plays a central and recurrent role in HasA function. The importance of hydrogen bonds in HasA will be investigated using a synthetic model approach. A characterization of the HasA heme-binding mode may facilitate the design of new antibiotics that target the HasA hemophore.

SEX IN PERSPECTIVE

Amanda Schleicher, Erica Halverson (Mentor), Curriculum and Instruction

Sex in Perspective is narrated by four students that wish to enlighten their audience on the different perspectives on sex based on their different experiences. Kelly talks about her issue with sex appeal. Spencer talks about his regret with taking a girl's innocence. Amanda talks about her experience with sexual violence. Micah makes the connection between an experience and the different perspectives that are derived from it.

IMPROVING HOSPITAL READMISSION RATES: A COMPARISON OF MODELS FOR REDUCING READMISSION RATES AND COST

Maureen Schuessler, Ashley Buglass, Ana Schaper (Mentor), Nursing

Hospital readmissions create significant burdens to patients and are one of the largest preventable health care costs. Improved transitional care is one method of reducing readmission rates. The purpose was to evaluate several transitional care models for their efficacy in reducing hospital readmissions. Three best practice models were selected for review from the Agency for Health Care, Research, and Quality (AHRQ) website. Programs utilizing a transitional leader to initiate extensive discharge planning, follow-up, and patient education have positively improved patient outcomes and reduced hospital costs. Nurses should initiate transitional care to improve patient and nurse satisfaction, promote self-care, and ultimately reduce healthcare costs.

INTERACTIONS OF GLYCINE BETAINE WITH DNA SURFACES

Mara Seefeld, M Thomas Record Jr (Mentor), Biochemistry

Solutes affect the unfolding of nucleic acid helices and other processes where large amounts of surface are exposed by competing with water to interact with that surface. Glycine betaine (GB), a common osmolyte, destabilizes GC-rich DNA and has little effect on AT-rich DNA. The goal of this research is to predict and interpret these effects of GB from studies of its effects on the solubility of model compounds (DNA bases and base analogs) containing DNA functional groups. I am determining solubility of these model compounds as a function of GB concentration using UV absorbance measurements. I will interpret these data using a thermodynamic analysis to obtain individual GB-functional group interaction coefficients that can be combined to predict the effect of GB on DNA helix unfolding.

RELATIONSHIP OF SMAD3 AND MAP KINASES TO VSMC PROLIFERATION IN INTIMAL HYPERPLASIA

Namratta Sehgal, Karla Esbona (Mentor), Surgery

Intimal hyperplasia (IH), or thickening of the intimal layer of the vessel wall after injury, is believed to be a result of proliferation and migration of vascular smooth muscle cells (VSMCs). Previous studies have shown that overexpression of Smad3 after vessel injury enhances IH, resulting in the phenotypic switch of VSMCs from quiescent to proliferative; this is mediated by the TGF- β Smad-dependent pathway. Additionally, upregulation of Smad3 has been shown to activate the Mitogen Activated Protein (MAP) kinases. Using several mutations in known binding sites of Smad3, I will examine how these affect the activation of several MAP kinases including: ERK, JNK and p38. Identification of the Smad3 binding site responsible for VSMC proliferation presents a target for pharmacological blockade and prevention of IH.

RESPONSES OF NET CO₂ ECOSYSTEM EXCHANGE IN MOUNTAINOUS TERRAIN

Ihor Sehinovych, Ankur Desai (Mentor),
Atmospheric and Oceanic Sciences

Reducing uncertainty on future climate change requires that we quantify the global land carbon cycle. Many researchers measure net ecosystem exchange (NEE), the amount of carbon entering and leaving the ecosystem. Yet, global carbon modelers are likely to be incorrect in measuring NEE in mountainous terrain. Research on mountainous NEE of CO₂ is growing; however, no synthesis on how NEE varies in mountainous terrain has been performed. NEE values in mountainous terrain in the Northern Hemisphere were identified from several dozen peer-reviewed papers. These values were then compared against elevation, latitude, and mean annual temperature and precipitation. The results revealed a variety of responses of NEE in mountainous terrain, providing insights to hypotheses that suggest NEE declines with elevation and increases with decreasing latitude.

IS FORGIVING ONESELF AN EFFECTIVE COPING STRATEGY AND CONTRIBUTOR TO PSYCHOLOGICAL WELL-BEING?

Sarah Seibold, Richard Davidson (Mentor), Psychology

Forgiveness of others has been identified as an effective intervention strategy that leads to positive mental health outcomes. This study investigated the effects of self-forgiveness on behavior using an experimental design. The relationship between self-forgiveness, personal distress and psychological well-being were considered in terms of stress and coping. We measured willingness to forgive oneself with responses to hypothetical stories where the person had wronged others. Level of personal distress was assessed using a cognitive measure of attention, and psychological wellbeing with self-report measures. We predicted that individuals with a tendency to forgive themselves would use self-forgiveness as a coping strategy when presented with personal distress, and have greater psychological well-being. Implications of this research in developing new interventions that promote positive mental health are discussed.

EVOLUTION OF TRICHOME MORPHOLOGY IN PHYSARIEAE

Morgan Sell, Abigail Mazie (Mentor), Botany

Leaf trichomes in the tribe Physarieae (family: Brassicaceae) are a model system for studying developmental evolution because of the vast morphological variation between species. Previous studies analyzed nuclear and chloroplast genes to understand the trichome characteristics and phylogenetic relationships between species. Our work will focus on the nuclear gene BLT, which is known to play a role in trichome development. It will confirm earlier phylogenetic studies that resolved three clades, each with a distinct general trichome morphology. Additionally, our research will assist in the characterization of the ancestral trichome morphological state. High-resolution trichome images will be captured on an ESEM to supplement the molecular analyses and further untangle the mysteries of trichome evolution.

THE EFFECTS OF CHANGING CULTURE AND RELIGION ON BURIAL ORIENTATION

Jess Senjem, William Aylward (Mentor), Classics

Last summer I examined grave layouts at the archaeological site of Troy, Turkey, as well as researched journals on other Aegean sites, focusing on how they changed as the cities' cultures and religions transformed over time. Two factors that significantly changed were the position and the orientation of the body. Before the sixth century B.C.E., skeletons were in a contracted position, lying on their side and oriented North-South or East-West. After this, the bodies were placed in a supine position. With the rise of Christianity in the fourth century C.E., skeletons were laid with their heads in the West and feet in the East. My research shows consistency in burial practice throughout the region, most likely due to cultural and religious influences in this era.

LITHIUM BROMIDE BENTONITE EXCHANGE COMPLEX RESEARCH PROJECT

Missy Setz, Sabrina Bradshaw (Mentor),
Civil and Environmental Engineering

Bentonite is the main component of geosynthetic clay liners which are used in waste containment facilities. The exchange complex of bentonite changes when solutions of different cations are introduced, altering clay hydraulic properties and possibly contaminating groundwater resources. Contaminants permeating through the bentonite can contain ammonium that may constitute a portion of the exchange complex. The ASTM standard for determining the exchange complex of clay uses ammonium acetate to remove existing bound cations and replace them with ammonium. Any ammonium in the exchange complex is masked by the extracting solution and cannot be measured. This study tested the feasibility of using lithium bromide as the bound cation extraction solution. Successful extraction with lithium bromide allows for determination of all bound cations in bentonite, including ammonium.

ALCOHOL'S EFFECT ON ANXIETY AND FEAR

Benjamin Shapiro, John Curtin (Mentor), Psychology

Research and empirical evidence suggest that fear and anxiety are dissociable neurobiological substrates and have different implications in the etiology of drug addiction. A laboratory procedure has been developed to manipulate fear versus anxiety using predictable or unpredictable shocks, respectively. Recent research using this paradigm has shown that alcohol selectively reduces anxiety but not fear. However, it is unclear if alcohol can reduce anxiety when shock predictability is manipulated with respect to shock intensity. The current study will use the eyeblink startle response to determine the emotional response among mildly intoxicated participants while shocks are presented in unpredictable intensities.

EFFECT OF TASTE ON ACCEPTANCE OF UNFAIR OFFERS IN THE ULTIMATUM GAME: ROLE OF THE ANTERIOR INSULA

Timmie Sharma, Richard Davidson (Mentor), Psychology

The Ultimatum Game (UG) is a behavioral decision-making task in which “proposers” propose how to split money between themselves and “responders.” If responders accept, the money is split accordingly; if responders reject, neither player gets anything. Functional Magnetic Resonance Imaging (fMRI) research in neuroeconomics has uncovered a negative correlation between anterior insula activity and acceptance of unfair offers, but the causal relationship has not been well-addressed. We aimed to experimentally alter anterior insula activity by having participants taste quinine or sucrose, which both increase insula activity compared to a tasteless solution. Results obtained thus far will be presented. We believe this research helps uncover the role of the insula in economic exchanges and solidify the role of emotion in what classical economists consider irrational behavior.

SUFFRAGES OF THE FAITHFUL: PURGATORY AND THE EVOLUTION OF THE MEDIEVAL ENGLISH HOSPITAL

Katherine Siberine, Lee Wandel (Mentor), History

This project seeks to analyze the rise of English medieval hospitals as religious institutions and to determine why these hospitals took on increased educational responsibilities during the fourteenth century. This research draws on secondary as well as primary sources, such as theological texts and hospital records. The industry of suffrages, or intercessory acts such as prayer, almsgiving, and the mass, that arose in response to the Western Latin Church's systemization of Purgatory encouraged the wealthy to found hospitals. While the doctrine of Purgatory remained constant, changing social and economic conditions in the fourteenth century encouraged many hospitals to prioritize education over healing. This study reveals the intimate relationship between theology and social institutions in medieval Europe.

IN VIVO MONITORING OF CREB DEPENDENT TRANSCRIPTION IN ZEBRAFISH EMBRYOS

Joseph Simonett, Jerry Yin (Mentor), Genetics

CREB dependent transcription is necessary for normal neuronal development and function. CREB activity is involved in neurogenesis and multiple behavioral activities, but its exact functions are still unknown. Development of in vivo CREB dependent transcription assays will further our understanding of CREB function in the developing brain and serve as a tool to investigate CREB dependent pathways. Here we report on a CREB dependent transcription assay based on transient expression of a CRE-luciferase reporter construct in zebrafish embryos and suggest future applications of this assay.

THE ROAD TO THE DECISION

Michael Singer, James Baughman (Mentor),
Journalism and Mass Communication

Objective: To examine whether ESPN is a sports entertainment outlet or a hard news source and explore the ethical ramifications of both. ESPN doesn't address issues such as conflicts of interest, paying for news, and celebrity personae of on air personnel. All of these need further examination. Method: I got in touch with journalists via e-mail and Twitter. Twitter has been much more effective in getting in touch with more prominent writers. I've also read three books on the history of ESPN. Results: Fifty-page senior thesis that will hold ESPN more accountable. Since they are so enormous and have a monopoly on the sports media world, it's hard for anyone to discredit them. Conclusion: I believe that ESPN has numerous ethical issues that it doesn't address. I think that ESPN is trying to find a niche between hard news and entertainment and because sports aren't as important as world news, but do certainly mean a lot to people, they are exposing a new territory.

THE ROLE OF MECP2 IN CNS REGENERATION

Ruhee Singh, Bermans Iskandar (Mentor), Neurological Surgery

Currently, neurons in the spinal cord are not capable of regenerating injured axons. With the help of folic acid, axons have shown a significant degree of re-growth, however. This folate-induced regeneration methylates DNA, which is essential for axons to regenerate. Axonal growth through folic acid can be affected by many factors, including MeCP2. MeCP2 is a DNA-binding protein that acts as a transcription repressor. Here we will explore the role of MeCP2 in enabling axonal regeneration during folate treatment after injury. Lab rats given either 80 or 40 mg of folic acid per day will be tested with and without MeCP2, to determine its role in the spinal cord regeneration process. The absence of MeCP2 is expected to halt the regeneration process.

MASCULINITY IN THE ILIAD, THE ODYSSEY, AND THE AENEID

Jake Skebba, Matthew Vieron (Mentor), Classics

As canonical works of literature representative of the cultural trends and ideals of their respective societies, the Iliad, the Odyssey, and the Aeneid serve as valuable tools to investigate the classical Greek and Roman worlds. Specifically, the portrayal of the characters of Achilles, Odysseus, and Aeneas provide insight into ancient conceptions of proper gender performance. While both Mediterranean empires shared a somewhat similar culture, there were significant differences, and by comparing the Aeneid with the two Homeric epics we can further understand the ideals of masculinity inherent to each culture. This comparison, besides simply providing us with pure knowledge concerning classical Greece and Rome, gives us a solid background for analyzing masculine gender performance in the ancient world.

ESTIMATING ANCIENT PRIMATE POPULATION PARAMETERS FROM SEQUENCE SURROUNDING ANCESTRAL ALU ELEMENTS

Andrea Slavney, John Hawks (Mentor), Anthropology

High homology between the human and chimpanzee X chromosomes suggests strong directional selection on X loci since speciation, but differentiating between the effects of selection and chromosome population dynamics requires restricting DNA comparisons to neutral, ancestral sequence. To accomplish this, we aligned sequence surrounding conserved Alu elements acquired from chromosomes X and 7 of public human, chimpanzee and orangutan genomes using the genome analysis platform Galaxy. The average number of segregating sites (S) between pair-wise alignments was then used to ascertain an optimal model of the human-chimpanzee ancestral population including effective population size (N_e), genome-wide mutation rate (μ), sequence (t) and species (T) average divergence times.

INQUIRY-BASED SCIENCE OUTREACH IN RURAL WISCONSIN SCHOOLS AND ITS IMPACT ON UNDERGRADUATES

Lucy Smigiel, Kylee Morrison, Timmie Sharma, Michelle Harris (Mentor),
Institute for Biology Education

We describe our experiences working with peers and K-12 teachers to promote inquiry-based science in rural Wisconsin schools, and its impact on our own learning and attitudes toward science. We are co-chairs of the Biocore Outreach Ambassadors, affiliated with the UW–Madison Biology Core Curriculum (Biocore). Ambassadors enrich science curriculum by introducing inquiry-based activities aligned with Wisconsin science standards during classroom visits, Family Fun Science Nights, an after school science club, and a Summer Science Camp for 4th–12th graders. In this session, we present the results from a survey given to Ambassadors to assess the effects of their outreach experiences, including overcoming unexpected challenges, unexpected benefits, personal growth, and enhanced science knowledge. We also interviewed ambassadors and our academic advisor to further assess personal impacts.

FOR THOSE WHO PRAY IN CLOSETS: QUEER-CHRISTIAN CONFLICTS IN PERFORMANCE

Danez Smith, Christopher Walker (Mentor), Dance

For Those Who Pray in Closets: The Problem With Sundays is a one-man theatre production about Isaiah. In the daylight, Isaiah is a quiet church boy who listens to his mother and spreads the word of God. But, when the sun goes down and the pumps are slipped on, Isaiah is a budding drag princess bending gender and performing as fiercely as he tries to hide his relationship with the pastor's son from his mother and church family. Isaiah, who tries to dance his way around, gets caught in the middle of his church's drive to cure the community of the homosexual problem. Isaiah finds himself having to choose between his religion and sexuality, his God and his lover, his saint and his sin.

POST-AURICULAR REFLEX'S INDIVIDUAL DIFFERENCES IN EMOTION MODULATION

Parker Smits, Stacey Schaefer (Mentor), Psychology

Corrugator, a facial muscle measured through electromyography, has shown to be a reliable emotion modulator through consistent associations between images with negative valence and greater corrugator activity. Newer facial electromyography (emg) measures such as the post-auricular reflex (PAR) have not shown as much test-retest reliability as corrugator. In our study we hope to find sustainable emotional modulation in individual difference from corrugator to the post-auricular reflex in a range of images from positive, neutral, and negative valences. Based on these results we will predict the pictures with positive valence will have greater PAR responses and have less corrugators activity and vice versa.

ACTIVIN RECEPTOR SIGNALING REGULATES PROSTATE CANCER METASTASIS VIA REGULATING METALLOPROTEINASES

Stacy Smrz, Craig Atwood (Mentor), Medicine

The dissemination of localized prostate cancer to distant tissues such as the bone, lung and liver represents a prominent health care burden in the aging adult male population. One of the fundamental processes for invasion of cancer cells and their growth at distant sites is cellular detachment. We have identified that the suppression of activin receptor type II (ActRII) signaling promotes cell detachment. Suppression of ActRII signaling and cell detachment was associated with an increase in the expression of ADAM-15, a disintegrin metalloprotease whose expression is strongly correlated with prostate cancer metastasis. The role of activin and metalloproteases (MMPs and ADAMs) in cancer progression are now recognized, but the role of activin signaling in mediating the function of different metalloproteases is unknown. We hypothesized that activin signaling regulates prostate cancer cell metastasis via modulation of the expression and function of specific metalloproteases. This will be tested using RNA interference technology to control the expression of ActRII and assess the corresponding expression and function of MMPs and ADAMs. In addition, an inducible shRNA prostatic cell line will be developed to 1) further our mechanistic understanding of ActRII mediated cell detachment, and 2) develop a high throughput assay to screen for chemical inhibitors of cell detachment and migration.

SALMONELLA ENTERICA COLONIZATION ON ALFALFA SPROUTS

Katherine Sonnefeldt, Jeri Barak-Cunningham (Mentor), Plant Pathology

Salmonella enterica causes the most bacterial gastroenteritis illness in the United States, fresh produce being the most likely vehicle. Alfalfa has caused the most frequent outbreaks of any produce product, the FDA estimates that sprout-linked outbreaks account for 40% of all food borne illness associated with produce. Our experiments replicate the hydroponic irrigation system used for the mass production of alfalfa sprouts. Alfalfa seeds are inoculated with *S. enterica* mutants or wild type and populations are enumerated 24h post-inoculation. We found that *S. enterica* virulence genes, e.g., *purD*, are not required for plant colonization. However, we also found a plant colonization gene, STM3548, with a role in sugar transport. Further research is needed to characterize the role of this gene in plant colonization.

THE MOSAIC CAFE AND LOUNGE, INTERIOR DESIGN HOSPITALITY PROJECT

Rebekah Spidle, Mark Nelson (Mentor), Design Studies

The objective of this video clip is to evoke thoughts and feelings about an interior design restaurant project, completed in Interior Design 4 during the fall semester of 2010. The video takes the 3D model created for this project and animates it so the viewer can get a feel for the space. Along with the animations are other images and clips (licensed by Flickr for educational use) used to complement the animation to create the experience of being in the space. In addition to the video clip are presentation boards that explain the entire project, from concept statement to finished design. The video was created with the use of 3D Studio Max and iMovie. The presentation boards were created with the use of Adobe CS5.

EFFICIENT TRANSFECTION OF MESENCHYMAL STEM CELLS USING ELECTROPORATION

Anthony Sprangers, Brenda Ogle (Mentor), Biomedical Engineering

Mesenchymal stem cells (MSCs) are attractive candidates for tissue regeneration because they differentiate into many tissues and suppress immune responses. Genetic modification of MSCs allows researchers to better understand the mechanisms which underlie MSC functions. Electroporation is a common method of gene transfer which uses an electrical pulse to permeabilize the cell membrane and allow for gene entry. This technique can be used to efficiently transfect MSCs. This study examines possible negative effects of electroporation including, loss of potency or induction of differentiation. Immunocytochemistry and PCR were used to quantify expression of CD73 (an MSC potency marker) and lineage markers (i.e. osteogenic, adipogenic, and cardiogenic), respectively. Results indicate MSC populations maintain multipotency following electroporation suggesting electroporation is a viable option for efficient transfection of MSCs.

ANTISOCIAL

Amery Stafford, Thomas Berenz (Mentor), Art

My drawing is made from charcoal and displayed on white drawing paper. It demonstrates a contemporary scene on a bus stop of one woman listening to her iPod and the other texting on her phone. I chose this subject to draw because of the current effect of technology on our world. iPods and cell phones have changed our social life and caused our generation to become less interactive and isolated within our environments. They appear to be in their own world, ignoring everything around them. This is a problem today, because our interpersonal communication skills are inept, resulting in individualism.

OPTICAL COUPLING OF MICROWAVE RADIATION TO THE TRANSITION-EDGE HOT-ELECTRON MICROBOLOMETER

Sara Stanchfield, Eric Katzelnick, Peter Timbie (Mentor), Physics

The Cosmic Microwave Background (CMB) is a remnant glow from the Big Bang, and as such it provides us with a direct view into the early universe. By mapping out the CMB we are able to view the universe as it appeared when it was only 400,000 years old. The purpose of our project is to design an optical system to couple microwave radiation to the Transition-Edge Hot-Electron Microbolometers. This system will be designed and perfected by the use of electromagnetic simulation software and direct laboratory measurements. These detectors will allow us to measure the faint polarization signals in the CMB that are expected to be the result of gravitational waves generated in the very first moments of the universe.

()'BOTS

Kit Stanley, Christopher Walker (Mentor), Dance

()'Bots began as an investigation of the unusual feminine shapes my own body was capable of, but is now an exploration and commentary on all women's roles and images in western culture. The artistic process of how the work evolved from where it started is something I'd like to share with my audience. Audience engagement is important in an art form that requires viewership, but has been especially neglected in dance. I would like to change this culture by encouraging artist-audience contact. Artists can then share their own experiences, while facilitating conversations and discussions with the public about their art. I would like to share my work ()'Bots and discuss the applications and ideas it addresses in female gender roles.

CHARACTERIZATION OF MODULATION RECOGNITION FACTOR 1, A POSSIBLE CARDIAC TRANSCRIPTION FACTOR

Eric Statz, Eugene Kaji (Mentor), Medicine

Previous work on the Modulation Recognition Factor 1 molecule (MRF1) suggests it may be important as a transcription factor in cardiac tissue based on interactions with the Thyroid Hormone Receptor, a nuclear hormone receptor. We have attempted to ascertain this interaction between TR α and MRF1 by performing GST-Pulldowns to show an interaction in vitro. We will continue to perform luciferase assays following transfections to study the activity of the Thyroid Response Element in the presence of MRF1 and TR α . Early attempts to clone part of the MRF1 molecule previously shown to interact with TR α into a Yeast Two-Hybrid Bait Vector have failed, but attempts will continue in hope of characterizing further important interactions of the MRF1 molecule in possibly regulating cardiac cell transcription.

IS SEXUAL MEDIA CONSUMING PRIMETIME TELEVISION?

Sarah Steger, Megan Moreno (Mentor), Pediatrics

Studies show associations between sex in the media and increased premarital sex. Fewer studies have investigated differences of sexual references in the media, and their change over time. Two primetime television shows were examined using content analysis. Three episodes of each show were examined for sexual references. The number of sexual references did not change (an average of 13 vs. 16 per show), but the nature of references did. Three main themes were found: differences in intentionality, the role of sexual messages in the plot, and the extent of the sexual message. The change in the nature of references over time illustrates the difference in the messages displayed on television. The findings suggest that sex references are more explicit in modern shows.

THE IDENTIFICATION AND CHARACTERIZATION OF CYTOPLASMIC ACETYLATED LYSINES

Kelsey Stein, James Malter (Mentor), Pathology and Laboratory Medicine

Lysine acetylation by histone acetyl transferases (HATs) is a reversible post-transcriptional modification that plays a key role in regulating several biological processes, such as cell cycle, nuclear transport, and gene expression. Previous research has shown lysine acetylation contributes to regulation of almost all nuclear functions, but a recent study in *Science* determined that lysine acetylation also contributes to regulation of a large array of cytoplasmic functions. The goal of my research is to determine the function, recognition, regulation, and activity of the cytoplasmic acetylated lysines. A large number of enzymatic activity assays were completed using a synthesized acetylated peptide in the *cis* conformation. Isomerization, and therefore activity, was measured using absorbance on a spectrophotometer. An unacetylated peptide was used as a control.

INFLUENCE OF MEDIA'S SELF-ACCEPTANCE CAMPAIGNS ON ADOLESCENTS

Mara Stewart, Megan Moreno (Mentor), Pediatrics

Recently, the media launched several campaigns aimed at improving body image. The purpose of this study was to determine whether such campaigns have influenced adolescent's views on the "ideal" body type. Participants ages 16–22 completed a 15-question survey. Questions assessed the media's impact on adolescents' body image and whether adolescents believed the media emphasized the "ideal" body type or self-acceptance. Thirty-eight adolescents (68% female) participated. Eight percent of males and 31% of females agreed that the media's emphasis is moving towards self-acceptance. Eighty-three percent of respondents agreed that it was more important to accept their bodies than to have the "ideal" body type. Results showed that 96% of adolescents believed the media emphasized the "ideal" body but could balance the media's portrayal with their own self-acceptance.

DETERMINING THE ROLE OF INTESTINAL ACYL COA:MONOACYLGLYCEROL ACYLTRANSFERASE 2 IN ENERGY BALANCE

Adela Stieve, Chi-Liang Yen (Mentor), Nutritional Sciences

Intestinal acyl CoA:monoacylglycerol acyltransferase (MGAT) is a triacylglycerol synthesis enzyme thought to be important for the absorption of dietary fat. MGAT2 is expressed in the small intestine and is responsible for intestinal MGAT activity. Mice lacking the enzyme are protected from obesity and other metabolic disorders induced by a high-fat diet, although they absorb normal amounts of fat. To test the hypothesis that the level of MGAT2 expression in the intestine determines the propensity to gain weight on a high-fat diet, we have generated a series of genetically engineered mice. My project will characterize MGAT2 expression and activity levels in the small intestine of these mice and determine if MGAT2 expression levels correlate with levels of weight gain on a high-fat diet.

THE IMPACT OF MISMATCHED ELECTRODE PAIRS IN SIMULATED COCHLEAR IMPLANTS ON BINAURAL SENSITIVITY

Corey Stoelb, Matthew Goupell (Mentor), Waisman Center

Cochlear implants (CIs) are devices that allow deaf individuals to hear by directly electrically stimulating the auditory nerves. Some CI users receive a second implant because having two ears helps listeners to locate sound sources and understand speech in noisy environments. Usually when the second CI is implanted, its insertion depth into the inner ear differs from the first, resulting in a mismatch in frequency content between the ears. This study investigates the effects of frequency mismatch on the ability of CI users to locate sound sources and to perceptually fuse information from the two ears. Normal-hearing listeners were presented a CI simulation with controlled frequency mismatch through headphones. They provided subjective responses to determine if they could locate and fuse the sounds.

EFFECT OF TEMPERATURE ON SPECIFIC GRAVITY AND PREDICTION OF IGG IN COLOSTRUM OF DAIRY COWS

Clayton Stoffel, Michel Wattiaux (Mentor), Dairy Science

Dairy producers rely on colostrometers that measure specific gravity (SG) at 20°C as predictor of immunoglobulin (IgG) content and ability to provide adequate passive immunity transfer to newborn calves (which reduces risk of mortality). Our objective was to determine whether prediction of IgG could be done reliably at 4°C (refrigerated samples) or 38°C (fresh samples). Colostrum IgG content of thirty UW–Madison dairy herd cows was determined by radial immunodiffusion test and SG was measured using a commercial colostrometer and a hydrometer at temperatures of 4°C, 20°C and 38°C. Regression analysis indicated that slope varied across method and temperature. A reference chart for colostrum quality prediction based on temperature was created to improve the reliability of colostrometer measurements.

PLANET EXPRESS

Parag Suresh, Debra Holschuh-Houden (Mentor), Family Business Center

This project will evaluate the family business of Planet Express. I will analyze the company for what it is, and what it is not, doing well. I will incorporate research to explain what family dynamics should be considered that Planet Express is not really thinking about. I will then analyze key employees of Planet Express and express their roles, responsibilities, and how they interact with each other on a day-to-day basis. At this point, I will act as a consultant for the company, and lay out my suggestions for how Planet Express can work more effectively. In my conclusion, I expect to find that Planet Express is not concerning themselves very much with their bottom line and profits. But, ultimately, they need to.

CAN FMRI PREDICT INDIVIDUAL DIFFERENCES IN PERSONALITY?

Justin Swaney, Mary Meyerand (Mentor), Biomedical Engineering

Resting state functional Magnetic Resonance Imaging (fMRI) is a technique that measures fluctuations between different regions of the brain while at rest. There is a well characterized association between the medial prefrontal cortex (mPFC) and the amygdala, a component of the limbic system that responds reliably to emotional stimuli. The mPFC is hypothesized to regulate the amygdala; dysregulated interactions between the mPFC and the amygdala are common to a variety of mood and anxiety disorders. In this study, we measured the resting state functional connectivity in healthy adults between the mPFC and the amygdala and compared them to outside measures of personality and mood (depression, inhibition, activation, etc.) The goal of this study is to determine if individual differences in connectivity between the mPFC and the amygdala can predict individual differences in outside measures of personality. We expect to find that individuals with higher negative functional connectivity between the mPFC and the amygdala will score higher on measures of positive affect and lower on depression and inhibition scales.

RELATIONSHIP OF STRESS AND IMMUNE SYSTEM FUNCTIONING (IL-6) IN CAREGIVERS OF CHILDREN WITH AUTISM

Stuart Swanson, Elizabeth Larson (Mentor), Kinesiology

Most of us will caregive in our lifetimes. The impact of caregiving on physical health is not well understood. There is evidence that stressed caregivers have alterations in DNA that indicate significantly shorter lifespans. The mechanisms whereby stress alters physical health is unknown. Diminished immune system responses may be one such mechanism. Thus, how caregivers of children with disabilities vary on Interlukin-6, a biomarker of immune system functioning, may allow us to understand the impact of the chronic stress associated with caregiving. In this study we will examine the relationships between caregivers plasma IL-6 levels, and ratings on the Perceived Stress Scale and Psychological Well-being Scale. The findings can assist us in understanding a potential biological mechanism whereby stress alters caregiver's physical health.

EFFECTIVE CONNECTIVITY OF THE HIPPOCAMPUS AND AMYGDALA DURING EMOTION-VALENCED MEMORY FORMATION

Kyle Swinsky, Richard Davidson (Mentor), Psychology

The amygdala and hippocampus are two critical medial lobe structures that are intricate to the remembrance and adaptation of biologically and socially significant events. Enhanced effective connectivity between these two regions has shown a bidirectional increase during the retrieval of emotionally-valenced contextual information (Smith, 2006). Little research has been done on whether or not positive and negative contextual information have different effects on this connectivity. Using fMRI and dynamic models of connectivity we plan to examine relations among regional neural activity, specifically within the hippocampus and amygdala and contextual memory, using a retrieval task. To look at the role of emotion, we will attempt to manipulate the emotional context during encoding in order to parse differences due to emotional valence (e.g., positive-contextual and negative-contextual). The recognition task will be used to determine whether participants remember more positive- or negative-contextual images. It is hypothesized that encoding of negative-contextual events will be associated with increased connectivity given previous data that show greater activation in the amygdala during negative versus positive stimuli (Straube, 2008). In this study, we hope to introduce new information on the mechanisms of memory encoding which may inform future treatments for memory disorders.

EMPOWERMENT OF VOLUNTEERS IN ORGANIZATIONS

Faizan Tahir, Kali Deans, Anna Edelstein, Janalle Goosby,
Brian Christens (Mentor), Interdisciplinary Studies

The work of the Empowerment of Volunteers in Organizations (EVO) team is directed at grassroots and non-profit organizations. Our research is aimed toward understanding the impacts of civic activity from those who have been involved in community activism and organizing. We approach 25 organizations with advocacy-based work in the community, inform them on the direction of our research and ask if they're interested in participating. We provide a staff member of the organization with our Organizational Staff Survey to understand the work and structure of the organization from a leadership perspective. Upon completion, we request the distribution of our Volunteer Survey to the organization's volunteer database to fairly contrast leader and volunteer perspectives on the organization's work and levels of empowerment.

SYNTHESIS OF (+)CP99994 VIA Pd-CATALYZED AEROBIC OXIDATIVE CYCLIZATION OF A CHIRAL ALLYLIC SULFAMIDE

Chun Pong Tam, Shannon Stahl (Mentor), Chemistry

At the forefront of organic synthesis is the challenge of designing high-yielding and environmentally friendly syntheses of biologically active small molecules. This research details the asymmetric synthesis of (+)-CP-99,994, a potent non-peptide antagonist of neurokinin A receptor, via a novel and environmentally friendly palladium(II)-catalyzed aerobic oxidative carbon-nitrogen bond-forming cyclization. The proposed synthesis consists of eight steps and starts from cheap and commercially available starting materials. The key allylic sulfamide intermediate undergoes a stereoselective PdII-catalyzed aerobic oxidative cyclization, followed by ring closing metathesis and hydrogenation to afford (+)-CP-99,994. This concise synthetic scheme demonstrates the utility of PdII-catalyzed aerobic oxidation in total synthesis.

SYNTHESIS OF VICINAL AMINOALCOHOLS VIA PALLADIUM-CATALYZED AEROBIC OXIDATIVE AMINATION

Zhi Xu Tan, Shannon Stahl (Mentor), Chemistry

Several research groups have explored the use of molecular oxygen as an environmentally benign stoichiometric oxidant in palladium-catalyzed oxidative organic transformations. However, the efficiency and scope of these reactions remain to be fully tested and applied. We studied the oxidative transformation of allylic alcohols into vicinal aminoalcohols by tethering a protected nitrogen nucleophile to an allylic alcohol and performing an aerobic intramolecular Pd-catalyzed oxidative amination of the alkene. The effects of protecting groups on the nitrogen nucleophile, the diastereoselectivity of C-N bond formation as well as the functional group tolerance of this reaction were explored.

TESTING THE NUSE-NUSG MODEL FOR TRANSCRIPTION-TRANSLATION COUPLING

Soon Li Teh, Jason Peters (Mentor), Biochemistry

The fundamental cellular processes of transcription and translation are coupled in bacteria. RNA polymerase, which carries out transcription, and the ribosome, which conducts translation, are hypothesized to be physically associated via interactions between the transcription factor NusG, which binds to RNA polymerase, and NusE (also known as S10), which is a component of the ribosome. The purpose of this research is to understand the importance of the NusE-NusG interaction to transcription-translation coupling. Our experiments will identify mutations in NusE that specifically disrupt the NusE-NusG interaction, and these mutations will be tested for their effects on coupling. By disrupting the NusE-NusG interaction, we hope to understand the contribution of this interaction to transcription-translation coupling.

THE IMPLICATIONS FOR PRETERM BIRTH EXPERIENCED BY MOTHERS IN DANE COUNTY WISCONSIN

Aliyya Terry, Stephanie Robert (Mentor), Social Work

This study investigates whether there is a correlation between preterm birth and levels of stress experienced by black and white women who gave birth between 2005 and 2007 in Dane County, Wisconsin. Data from a survey of 770 women in Dane County included multiple measures of stress including financial stress, relational stress, and stress from poor access to resources and services. We hypothesize self-reported stress in multiple domains is associated with having a preterm birth. However, in light of the large decrease in black infant mortality in Dane County over the last decade, we also hypothesize that rates of stress among this cohort of black women will be lower than rates reported nationally among black women, perhaps contributing to the improvement in birth outcomes.

PRECURSOR PEAK SELECTION BASED ON PROBABILITY OF IDENTIFICATION IN LC-MS/MS BOTTOM-UP PROTEOMICS

Mark Tervo, Joshua Coon (Mentor), Chemistry

For sufficiently complex peptide samples, mass spectrometers are generally unable to obtain MS2 spectra of all the peptides despite extensive peptide separation. Moreover, MS2 spectra are not equally valuable since only a fraction of MS2 spectra yield confident peptide identifications. In this situation, the best result of an MS/MS proteomics experiment is to gather only the most valuable MS2 spectra. To move closer to this ideal result, we developed techniques to estimate the probability that a precursor peak will generate an MS2 spectrum resulting in confident peptide identification. We then showed that compared to controls, the data gathered from mass spectrometers using this technique yield a greater number of peptide spectrum matches and an equal or greater number of unique peptide identifications.

ANALYSIS OF GRADE STUDENTS' SCHOOL LUNCH TRAYS FOR SELECTION, CONSUMPTION AND NUTRIENT COMPOSITION

Cassandra Thiel, Dale Schoeller (Mentor), Nutritional Sciences

Prevention of childhood obesity is crucial to minimize the increased risk for adult obesity and related health consequences. Nutrition education can nurture positive dietary practices and avoid excess weight gain. We are therefore evaluating the impact of school-based nutrition education programs on food consumption in school lunches. In an evaluation of Wisconsin Farm to School programs, pre- and post-meal photos of school lunches are used to determine food selection and intake. Nutrient content of 3rd to 5th graders' school lunch intake was quantified in 703 children from 8 schools. Preliminary results show that most students' fruit and vegetable intakes were below the recommended 3/4 cup. This study will identify what elementary school children in Wisconsin are eating at lunch and serve as baseline for the program evaluation.

ROLE OF LLMF IN SECONDARY METABOLISM AND SEXUAL DEVELOPMENT IN ASPERGILLUS NIDULANS

Jeffrey Theisen, Jonathan Palmer (Mentor), Plant Pathology

Members of the fungal genus *Aspergillus* commonly infect both plants and animals, producing harmful mycotoxins that are detrimental to their hosts. A nuclear methyltransferase, *LaeA*, has been identified as a global regulator of secondary metabolism. *LaeA* has been shown to form a complex with another important protein, *VeA*. This complex regulates secondary metabolism and sexual development. A bioinformatics approach was used to search the genome for genes homologous to *laeA* in *Aspergillus nidulans*. This study focuses on one of the homologous genes, *llmF*. Results from a yeast two-hybrid assay, fluorescence microscopy, and genetic assays suggest that *LlmF* interacts with *VeA*. Through this putative interaction with *VeA*, *LlmF* regulates secondary metabolism and sexual development, illustrating the complex nature of secondary metabolism regulation in the *aspergilli*.

INFANT-PARENT INTERACTION LAB: 24-MONTH INFANT SLEEP AND MATERNAL DEPRESSION

Caitlin Thompson, Elizabeth Cagle, Cameron Curz, Melissa Kraina, Julie Poehlmann (Mentor), Human Development and Family Studies

Data were collected from 181 preterm and low birth-weight infants and their families in an ongoing longitudinal study (PI: Prof. J. Poehlmann). In this report, we focus on maternal depressive symptoms and child sleep at 24 months of age, corrected for prematurity. Actigraph data and maternal reports of children's night wakings were used to determine continuity of the child's sleep and sleep disruption of mothers due to children's signaling at night. Previous research suggests an association between less optimal child sleep patterns and maternal depression. Of particular interest to us is the association between more reported night waking and maternal depression at 24 months, as well as elevated actigraph measurements and maternal depression at 24 months.

THE PERFORMANCE OF GEOSYNTHETIC CLAY LINERS WHEN PERMEATED WITH ALUMINUM PROCESSING LEACHATE

Ross Tipton, Sabrina Bradshaw (Mentor), Geological Engineering

Geosynthetic clay liners (GCLs) are commonly used for the containment of aluminum processing leachate (APL) to prevent the leachate from contaminating soil and ground water. APL has a pH of 13.3 and ionic strength of 0.7 M, which reduces the hydraulic performance of the GCL. Tests were conducted where GCLs were saturated with DI water and then permeated with APL. Measured hydraulic conductivities were 3×10^{-9} cm/s, which is typical for a GCL. However, when the GCL was realistically prehydrated by contact with a moist subgrade to a water content of 70%, hydraulic conductivities of $>10^{-6}$ cm/s were measured. Currently tests are running with GCLs hydrated to 85% water content, and the hydraulic conductivity is expected to be within the acceptable range.

HOW TO CONDUCT BUSINESS IN TAIWAN EFFECTIVELY

Paul Toepke, Yung Wei, Debra Holschuh-Houden (Mentor),
Family Business Center

A typical mistake corporations make when expanding operations internationally is to assume they understand their market segments. Simply understanding the business will not lead to success. Understanding the vast complexities between cultures and becoming more familiar with traditions and customs are essential to succeeding globally. Taiwan's relationship with America has been steadily increasing and it is important to understand that trading partner. For instance, in America, it is a sign of respect to maintain eye contact in order to show the speaker they have one's attention and respect, but in Taiwan, it is frowned upon. In America, we value our individuality, whereas in Taiwan, the emphasis is more on unity. We will research various cultural implications of doing business with family enterprises of Taiwan.

OLDER BREAST CANCER SURVIVORS' SYMPTOM BELIEFS AND BARRIERS TO SYMPTOM MANAGEMENT

Taryn Tougas, Susan Heidrich (Mentor), Nursing

The purpose of this study was to describe beliefs about symptoms and perceived barriers to symptom management in older breast cancer survivors. Data were from a randomized controlled trial of a symptom management intervention for older (aged 65+) breast cancer survivors. Fifty women in the intervention group participated in audio recorded, transcribed interviews with advanced practice nurses about their symptoms. Content analysis of the interviews was conducted. Frequencies and percentages of each category of beliefs and barriers will be calculated. Correlations among beliefs, barriers, symptom distress, and quality of life will be computed. This information will help clinicians involved in the care of cancer patients.

NON-PROTEIN CODING MAMMARY CARCINOMA SUSCEPTIBILITY LOCI ASSOCIATED WITH GENE EXPRESSION CHANGES

Van Ann Tran, Michael Gould (Mentor), Oncology

The risk of developing breast cancer includes a woman's environment and inherited genetics. Genome-wide association studies have identified approximately twenty-five mostly non-protein coding alleles associated with a low relative risk at a high population frequency. Applying a comparative genomics approach with the mammary carcinoma susceptible Wistar-Furth and resistant Wistar-Kyoto or Copenhagen rat strain two loci, *Mcs1a* and *Mcs5a*, were discovered that confer resistance to mammary carcinoma multiplicity. As these loci are non-protein coding, it is hypothesized that they regulate the expression of nearby genes in a tissue specific manner. Using congenic rat lines, I discovered that *Mcs1a* increases the expression of COUP-TFI in mammary glands and the human/rat-conserved breast cancer susceptibility locus *MCS5A/Mcs5a* down regulates the expression of *Fbxo10* in the thymus primary T-cells and cultured T-cells.

SWINE FLU

Niko Tumamak, Dennis Miller (Mentor), Art

This class project is a campaign for human rights; its main purpose being a revival of awareness or reenforcement. This project in particular was inspired by a senseless act by a police officer in my hometown neighborhood in Chicago. This police officer murdered a teenage boy with a gun shot to the nose, claiming he mistakenly suspected the young man's mobile phone for a gun. Other instances similar to this occur frequently in the city.

THE ROLE OF CB1 AND CB2 RECEPTORS IN EDEMIC RESPONSE FOLLOWING SPINAL CORD INJURY

Jeanet Ugalde, Nayab Khan, Gurwattan Miranpuri (Mentor),
Neurological Surgery

We are studying the role of the cannabinoid system CB1/CB2 receptors and how it influences the painful stimuli following spinal cord injury (SCI). Rats will undergo a T-9 laminectomy followed by a contusion SCI by dropping a 10g weighted rod at 12.5 mm height. Tests and MRI analysis will be performed three times weekly for two weeks. At post SCI day 42, the injured spinal cord tissue will be removed and undergo western blotting and immunochemistry analysis to be evaluated for expression of NKCC1. The primary goal of this experiment will be to determine the degree of edema formation and the development of neuropathic pain following SCI with and without injections of the non-specific CB1 and CB2 receptor agonist, WIN55,212-2 (WIN). We propose that activation of CB receptors by WIN following SCI will reduce edema resulting in decreased responsiveness to neuropathic pain.

THE SEARCH FOR AN AMERICAN UTOPIA

Paula Uniacke, Lee Wandel (Mentor), History

The purpose of this study is to determine what drives Twin Oaks, an attempted modern utopian society, and how this “egalitarian intentional community” balances an alternative lifestyle with contemporary American mainstream values. Through interviews and a personal visit to the community in Virginia, I will assess what necessary adaptations the community has made to classical utopian standards expressed in Plato’s “Republic” and Thomas More’s “Utopia.” I hypothesize that by accepting some contact with modern society and not attempting to live in a vacuum, Twin Oaks is able to reconcile long-held utopian values with the often-conflicting yet influential values and precedents of contemporary America. This study will provide valuable insight into how such an anomalous society thrives alongside mainstream culture.

THE INFLUENCE OF LONG-TERM DROUGHTS ON LAKES

Cameron Vafi, Patricia Sanford (Mentor), Center for Climatic Research

The main purpose of the study is to assess how the elevation of lakes affects response to change in precipitation by analyzing lake characteristics from a data base of 61 lakes. In this question our research division will be analyzing sponge spicule widths. The widths of the sponge spicules have a strong correlation with dissolved reactive silica (DRSi). Our hypothesis is that droughts will bring about a decreased concentration of cations and silica and a lower pH level at high elevation lakes. Lakes at lower elevations will have increased concentration of cations and silica and little change in pH level. Focusing on the response of lakes in different landscape positions to climate change is important in understanding the different climate signals, like droughts, taken from connecting lakes.

RACE, CLASS, AND GENDER IN BOLIVIA

Fabiola Valenzuela, Christina Ewig (Mentor), Gender and Women's Studies

As the first indigenous president of Bolivia, Evo Morales has risen to power with help from traditionally excluded sectors of society, including women, the working class, and indigenous groups. Now into his second term, how well has he managed to balance the interests of the groups that helped place him in power while attempting to maintain the prosperity of Bolivia as a whole? In this research project I have explored the impact of these three social groups by compiling articles from two Bolivian newspapers from September 2010 to April 2011. In addition, I have begun the work of classifying the ethnic and gender identification of past and present presidential cabinets in order to see how ethnic and gender representation have changed over time.

TUMOR-ASSOCIATED MYELOID CELLS CAN BE ACTIVATED IN VITRO TO MEDIATE ANTITUMOR EFFECTS

Tyler Van De Voort, Alexander Rakhmievich (Mentor), Human Oncology

Tumor growth is accompanied by the accumulation of myeloid cells in the tumor and lymphoid tissues. This project shows that these tumor-associated myeloid cells can be activated to mediate anti-tumor effects. For a model, we injected B16 melanoma cells intraperitoneally into C57BL/6 mice, collected peritoneal cells after 14 days of tumor growth, and sorted the cells using flow cytometry. Cells were sorted based on particular phenotypes (cells expressing CD11b and GR-1 surface markers) and on their size. Cells were stimulated in vitro with IFN- γ and LPS and assessed for their ability to secrete nitric oxide and suppress B16 tumor cell proliferation. Our results show that regardless of their characteristics, tumor associated myeloid cells can mediate anti-tumor effects through a nitric oxide-independent mechanism.

AN EFFECTIVE MEDIUM FOR ISOLATION OF DOLLAR SPOT FUNGUS FROM CREEPING BENTGRASS SEED

Benjamin Van Ryzin, James Kerns (Mentor), Plant Pathology

Dollar spot is a destructive pathogen of turfgrasses used for golf courses, athletic fields, sod farms and home lawns. The biology of this pathosystem is unclear; therefore we proposed to elucidate a possible source of the disease. To do so, we established experiments to develop a selective medium to isolate and culture the fungus. Then we isolated the dollar spot fungus from turfgrass seed lots using the selective medium. We also placed infected, uninfected and disinfected seed onto the selective medium, and documented the frequency of fungal isolation. Molecular and morphological techniques were used for fungal identification in these experiments. Determining the source of dollar spot inoculum allows for the development of novel management strategies for dollar spot.

EMOTION

Pakou Vang, Sophia Flood (Mentor), Art

Although being an artist, I am not very good with symbolism. With this project, I have to deal with a great deal of symbolism that brings forth some personal issues I was going through from its beginning to end. Relationships go bad; relationships test a person. Since my painting had a “crack” in the middle, I decided to place the girl in that area to show uncertainty and confusion a person goes through when making an impacting decision. “Speakers” were placed at the bottom to represent her voice. Lampposts are usually seen as an item that helps lead people to find their way. Thus, a lamppost is present to show mercy. The splattered Indian ink was just an addition out of frustration.

FAMILY BUSINESS OF THE NFL

Samuel Vergara, Debra Holschuh-Houden (Mentor),
Family Business Center

The research of this project is to analyze the business model incorporated by the National Football League which forbids corporate ownership of a franchise and mandates that teams be family-owned (with Green Bay being the lone exception). This unique model has been lucrative for the league in contrast to other major sports, such as Major League Baseball, which have experienced major turnover with the sales of teams: The longest-tenured ownership group is currently the Steinbrenner family, which bought the Yankees in 1973. I plan to research the facets of family-owned franchises and compare them to that of corporate or business group franchises to develop an understanding of the benefits that family ownership bring in terms of profitability to a team and to the league, as well as why original franchise owners in the NFL are diminishing. I expect to find that family ownership brings the overall sense of football operations, tradition, and legacy being at the foremost which enriches the experience for fans which identifiable character differentiating each team.

FITNESS ON FACEBOOK: ADVERTISEMENTS GENERATED IN RESPONSE TO PROFILE CONTENT

Hope Villiard, Megan Moreno (Mentor), Pediatrics

Obesity affects half of college students and only 30% of students obtain adequate physical activity for health benefits. Over 94% of college students currently maintain a Facebook profile; advertisements on Facebook are tailored to the displayed content. The purpose of this project was to determine if fitness keywords generate fitness-related advertisements. Individual profiles were examined to determine types of displayed fitness references; Facebook was explored to observe advertisements generated in response to fitness references. 58.12% of profiles evaluated referenced fitness behaviors; 88.24% referenced physical activity, 8.82% poor diet. Most advertisements were for fad diets or junk food. Thus, students reference both healthy and unhealthy fitness behaviors on their Facebook profiles, and these trigger fitness-related advertisements of which few are healthy.

FACEBOOK'S AFFECTS ON ADOLESCENT SLEEP PATTERNS

Leah Wachowski, Megan Moreno (Mentor), Pediatrics

The research purpose was to study if more time spent on Facebook leads to less sleep. College freshmen logged amount of time sleeping and amount of time on Facebook for three days/two nights and responded to a survey about Facebook affecting sleep. Twenty laptop owners completed time logs (87% response); mostly female (70%), mean age of 18.6, and 35% had Smartphones. Increased Facebook time was associated with decreased sleep ($B=-0.74$ $p=0.02$). Females spent an average 101 minutes daily on Facebook, seven log-ins, 974 minutes sleeping and said sleep was indirectly affected. Males spent an average per day of 61 minutes on Facebook, five log-ins, 980 minutes sleeping and said sleep was unaffected. Findings suggest that healthier sleep is supported by less time on Facebook.

DEGRADATION OF PRION PROTEIN BY ENZYMES FROM BIOLOGICALLY STIMULATED SOIL

Tyler Wadzinski, Joel Pedersen (Mentor), Soil Science

Transmissible spongiform encephalopathies, TSEs or prion diseases, are fatal neurodegenerative diseases affecting a variety of mammals. Prion diseases are associated with accumulation of a misfolded protein, designated PrPTSE. Strong evidence suggests soil-bound prions are involved in the environmental transmission of some TSEs. Prions exhibit extraordinary resistance to proteolysis, and can persist in the environment for several years. In this study, PrPTSE degradation by enzymes from biologically stimulated soil was examined. Enzyme production in soil was initiated with nitrogen amendments, and proteolytic activity was monitored colorimetrically. Preliminary results indicate limited PrPTSE degradation in stimulated soils. Future studies will examine the influence of soil amendments, incubation time, and temperature on enzyme production.

ASSESSMENT OF SOX11 EXPRESSION AS A PROGNOSTIC MARKER IN MANTLE CELL LYMPHOMA

Jeffrey Wagner, David Yang (Mentor), Pathology and Laboratory Medicine

Mantle cell lymphoma (MCL) is a B-cell lymphoma with a short survival period after diagnosis and no reliable prognostic indicators. Gene expression studies have shown that SOX11 negatively correlates with indolent cases of MCL and is a tumor suppressor. Recent studies found conflicting associations between SOX11 immunohistochemical staining and clinical outcomes. 62 cases of SOX11 expression were assessed by two independent pathologists with their results validated by AQUA scoring. These were broken into quintiles based on SOX11 scores and compared overall survival (OS). The 11 cases in the lowest quintile of SOX11 expression had poorer OS (median 31.9 months) compared to the remainder (median 70.3 months). These findings suggest that MCL with low expression of SOX11 by immunohistochemistry may serve as an effective prognostic indicator.

PLACENTAL DYSFUNCTION MAY BE IMPLICATED IN PCOS FROM A PRIMATE MODEL OF PRENATAL ANDROGEN EXCESS

Ashley Wagner, David Abbott (Mentor), Obstetrics and Gynecology

Polycystic ovary syndrome (PCOS) is the leading cause of infertility in women during childbearing years. Discrete fetal androgen excess during early gestation in rhesus monkeys may lead to placental disruption that may occur in pregnant women with PCOS. From 40–80 days gestation, pregnant rhesus monkeys received 15 mg of either testosterone propionate or oil vehicle subcutaneous injections daily. The placentae were obtained at term via Cesarean section. Selected morphometric parameters will be counted in the different placental villi structures. We hypothesize increased fibrotic placental villi and numbers of white blood cells, indicating inflammation. The etiology of PCOS is unknown and understanding the structural differences between the androgen exposed placentae and those from controls will provide an insight into potential mechanisms for adult PCOS.

NOT TRASH: AN INTERPRETATION OF MOROCCAN RAG RUGS

Ramona Walsh, Diane Sheehan (Mentor), Design Studies

Everyday in the studios of the Design Studies department students are working to create unique projects, primarily out of fabric. The fabric scraps of these projects often end up in the trash. In a desire to find a way to recycle these scraps I was inspired by the tradition of rag rugs, especially those of the nomadic people of Morocco. Contemporary Moroccan rag rugs are made of any fabric, plastic, or nylon available to the weavers. I was inspired to create these rugs from recycled fabric to be functional, and aesthetically pleasing. The rugs tell the story of the fabric and how far it can go even after it has fulfilled its initial purpose.

FOLIC ACID-INDUCED RECOVERY FOLLOWING RAT SPINAL CORD CONTUSION: ASSESSMENT OF OUTCOME USING DTI

Tyler Wanke, Lisa Wrazidlo, Bermans Iskandar (Mentor),
Neurological Surgery

Our recent studies have demonstrated that rats treated with an optimal dose of folic acid undergo a significant improvement in axon re-growth and motor function in the injured adult CNS. However, translating these effects to humans has limitations, the main one being the lack of reliable non-invasive techniques to assess the outcome. In this study, we utilized Diffusion Tensor Imaging and Tractography, two MRI-based technologies that are safe, non-invasive and translational, to assess outcome. Combined with functional recovery data, we provide evidence that these MRI techniques may provide a non-invasive means to ascertain the regenerative effect of folic acid on spinal cord repair.

DOOMED

Alana Wanke, Sophia Flood (Mentor), Art

I decided to address a natural landscape combined with a city. I thought the idea of a natural landscape juxtaposed with a city would be intriguing to look at, and effectively get my point across. I named this project Doomed because I'm concerned for the Earth's many landscapes that are disappearing everyday at the hand of man. The reflection represents how many humans see this landscape, and it's future. I want this scenery to be seen, as it is, not as an opportunity to expand our already excessive cities. I used oil pastels to create very bright and exaggerated colors, and chalk pastels to create the dull, blurred look of the reflection.

BODY WEIGHT AND PUBERTY: INCREASED CALORIC INTAKE REDUCES THE AGE OF MENARCHE

Morgan Weber, Ei Terasawa-Grilley (Mentor), Pediatrics

Obesity is increasing while the age of pubertal onset is decreasing in our human society. It is hypothesized that body weight growth, accelerated by higher caloric intake, is critical for the timing of puberty. To test this hypothesis two groups of prepubertal female monkeys were fed either high fat (high calorie) diet or control diet. A high fat diet group gained weight significantly faster than the control group. The high fat group menstruated at an average weight of 3.13kg before 20 months old, which was earlier than the control group (averaging 2.55kg at the same age). These findings suggest higher caloric intake and accelerated weight gain reduce the age of menarche.

INFLUENCE OF MYCORRHIZAE ON THE SUSCEPTIBILITY OF POPULUS TREMULOIDES TO HERBIVORY

Cecilia Welch, Kennedy Rubert (Mentor), Entomology

Declining aspen (*Populus tremuloides*) populations have been linked to excessive deer herbivory, and the soil rhizosphere is postulated to influence the ability of these trees to tolerate browsing. This experiment investigated the influence of soil mycorrhizae on the chemical responses of five *P. tremuloides* genotypes to simulated deer browsing. The presence or absence of *P. tremuloides*-adapted soil mycorrhizae did not influence foliar C/N ratios; however, foliar C/N ratios were genotype-dependent and decreased following browsing ($p < 0.05$). Increased nitrogen levels in the leaves of browsed trees might make them more prone to subsequent herbivory; however, susceptibility to browsing will likely also depend on the interaction between the abundance of nitrogen and anti-nutrients such as tannins.

ACCESSORY GENE REGULATOR FUNCTION DURING ANTIBACTERIAL TREATMENT IN METHICILLIN-RESISTANT S. AUREUS

Justine Wergin, Christopher Day (Mentor), Pharmacy

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a pathogen that causes complications in the treatment of many patients. The accessory gene regulator (*agr*) is responsible for the virulence of MRSA. The *agr* may have an effect on the release of toxins, which are responsible for the necrosis of tissue during infection. This study will test the effect of different antibiotics: Clindamycin, Linezolid, Minocycline, Vancomycin, and Trimethoprim/sulfamethoxazole on *agr* function during treatment. The samples from time periods 0, 24, 48, and 72 hours will be analyzed to determine if the *agr* is functioning at these time points. The results will be analyzed to determine which antibiotics have a diminishing effect on *agr* function, which could aid in the treatment of these complicating infections.

TREATMENT OF CHALLENGING BEHAVIOR BY PARENTS OF CHILDREN WITH DEVELOPMENTAL DISABILITIES VIA SKYPE

Kristen Westenfield, Wendy Machalicek (Mentor), Rehabilitation
Psychology and Special Education

Past research suggests that performance feedback may contribute to improved treatment adherence for parents of children with challenging behavior, but behavior specialists and families may find the cost and time involved prohibitive. This study evaluates the effects of performance feedback provided via video tele-conferencing on parent acquisition and generalization of intervention strategies across desired family routines for three parents of children with developmental disabilities who engaged in challenging behavior. Based on the results of functional analyses and multielement treatment comparisons, interventions were selected and implemented by parents with performance feedback via VTC. The effects of parent implemented intervention on challenging behavior will be evaluated using a multiple baseline across participants design. Data on the efficacy of parent implemented intervention is to be collected.

THE ROLE OF TCF19 IN PANCREATIC β -CELL MASS REGULATION AND DIABETES PREVENTION

Amy Whillock, Dawn Davis (Mentor), Medicine

Insulin is necessary for transporting glucose from the blood into the cells and is produced by pancreatic β -cells. In diabetics, reduced numbers of functional β -cells lead to insufficient insulin production, resulting in high blood glucose. Tcf19 is a transcription factor only expressed in dividing cells, suggesting Tcf19 may play an important role regulating transcription during the cell cycle. We have demonstrated that knockdown of Tcf19 expression in β -cells leads to reduced cell growth, which led to our prediction that Tcf19 is a transcription factor that drives β -cell growth. We hypothesize that overexpression of Tcf19 in a transgenic mouse model will increase β -cell proliferation and β -cell mass, resulting in increased insulin production. This novel pathway to increase β -cell mass may lead to new treatments for diabetes.

NESTIN-POSITIVE CELLS IN THE THIRD VENTRICLE EPENDYMAL CELL LAYER OF THE ADULT RAT BRAIN

Alyssa Wield, Ronald Kalil (Mentor), Ophthalmology and Visual Sciences

Nestin is a protein marker commonly used to label neural progenitor cells. Two groups of cells within the walls of the third ventricle express nestin: ependymal cells and tanycytes. The objective of this study was to map the distribution of these two cell types throughout the third ventricle. Co-localization studies were conducted to determine the base rate of division for nestin-positive cells, as represented by bromodeoxyuridine (BrdU) expression. Results indicate that nestin-positive ependymal cells divide infrequently, whereas tanycytes do not divide at all. Experiments are currently underway to determine if a cortical lesion will induce these nestin-positive cells to divide more frequently. Such results would further support the claim that ependymal cells are an endogenous source of neural progenitor cells with therapeutic potential post-injury.

GEORGE ELIOT'S FICTIONAL HISTORIOGRAPHY

Alicia Williams, Susan Bernstein (Mentor), English

Before becoming one of the most celebrated nineteenth-century novelists innovating and forwarding the aesthetic doctrine realism, often through historical realism, George Eliot mastered a different discourse: the Victorian periodical press. This project shows how the voice of Eliot's criticism, both as contributor and editor, revised the paradigmatic, anonymous, distant, elitist "we" point of view characterizing most periodicals. With that of her commentary, this analysis addresses the early connection she made between voice and morality as forces that help realize and make appreciable the other. Drawing on this connection, I argue that Eliot's voice shapes the history in her fiction into a body of fictional historiography. Voice strategies implicate the reader in designing and understanding the most morally productive, ethically sound way to study the past.

THE TEMPORAL EXPRESSION OF IRX4 MOUSE EMBRYONIC STEM CELLS

Erin Willing, Gary Lyons (Mentor), Anatomy

The Iroquois related homeobox gene, *Irx4*, is highly conserved in all vertebrates. Its expression is restricted to the ventricles of the heart, and begins early in embryonic development. I am focusing on *Irx4* expression using analyses of fluorescent and bioluminescent reporters that have been inserted into the 3' end of the *Irx4* coding region. Studying the temporal expression of *Irx4* during mouse embryonic stem cell differentiation is important because ES cells tagged in this manner may be used to characterize populations of progenitor cells that can become ventricular myocytes. Ventricular muscle sustains extensive damage following a heart attack. *Irx4*⁺ cells may be used in the future for developing regenerative cell therapies for patients with cardiovascular disease, especially those who have suffered from a heart attack.

DOGS AND DROIDS: EXPLORING HUMAN RELATIONSHIP WITH ANIMALS AND COMPUTERS

Rachael Wooten, Taylor Marx, David Ramirez,
Bilge Mutlu (Mentor), Computer Sciences

In our research, we believe a person's ability to interpret social cues in other humans and in robots will increase with pet ownership, and will increase more with formal training on how to interpret his/her pet's specific social cues. In order to test this hypothesis we have recorded videos of people displaying cues of positive and negative dominance as well as positive and negative submission, and then we have the robot display the same cues. A person with a pet will then view the cues of both the robot and person, and a person without a pet will do the same. We will then analyze the results to see if there is a correlation between pet ownership and ability to read social cues.

A DAY AT THE BEACH

Kelsey Wright, Thomas Berenz (Mentor), Art

My contemporary landscape's intent is to expose the industrialization and carelessness that we have for our environment. Recently, the BP oil spill affected many lives, both of animals and the habitats in which they lived. What was once a beautiful landscape is now marred with dirty, industrial sewage. My landscape becomes much about the interaction of the people living on the coast in relation to the tragedy that happened. There is a sense of helplessness that is inescapable when facing such a huge problem. Even the company at fault wasn't able to immediately repair the damage. In a way, everyone present was turned into a helpless child, only able to watch as the world as they knew it dissolve under mucky washes of black.

FAMILY BUSINESS IN THE PUBLIC EYE: AN ANALYSIS OF THE KARDASHIAN FAMILY

Amanda Wyszynski, Elise Benvenuto, Debra Holschuh-Houden (Mentor),
Family Business Center

The dynamics of a family business are complicated enough without the process being exposed through media channels. The Kardashian family faces a unique situation, as they agreed to televise their day-to-day business operations nationally. Their first television show led to three spin-off shows, making reality TV another one of their business ventures. Another interesting aspect of this family is the growing number of family members actively involved in the family business. It has to come to include immediate family, stepsiblings, and in-laws as the family expands. The goal of our analysis is to evaluate the positive and negative effects of maintaining a family business in the public eye. We plan to do an in-depth analysis on each business venture to see how it impacted family relationships.

COMPILING WEB-BASED ART RESOURCES FOR ARTISTS AND THE GENERAL PUBLIC

Amanda Yang, Leslee Nelson (Mentor), Liberal Studies and the Arts

The purpose of this research is to create a website with different online resources for current and potential artists. I focused on looking for resources on scholarships and out-of-the-box art, artwork that is out of the ordinary and do not fit a specific category. Using Google.com, I collected data on scholarships and artists and their projects. The websites were categorized into subcategories of creative income solutions and do-it-yourself projects. Results yielded a number of artists with tutorials, art for sale, and advice on different resources to use; scholarships found were specific for art-related students. This website will be beneficial as a guide for artists on how to support themselves doing what they love to do.

HIPPOCAMPAL PLASTICITY IN EPILEPSY

Bee Yang, Thomas Sutula (Mentor), Neurology

The main objective of the Sutula neurology lab is to determine whether genomic and magnetic resonance imaging (MRI) can predict the development of post-traumatic epilepsy and post-traumatic stress disorder in lab rats. Undergraduates are assigned one or multiple tasks which includes: surgery to induce brain trauma or to install hippocampal implants, kindling as a means to induce seizures, electroencephalogram video recordings, that involve monitoring behavioral seizures accompanied by epileptic spikes, MRI/Histology is used to map out the hippocampus in order to isolate brain areas most affected by seizures, and fear conditioning which is tested in a rat water maze. This research also seeks to identify the specific effects of 2-deoxy-D- glucose, an anticonvulsant believed to reduce susceptibility to epilepsy.

INCREASED GENE EXPRESSION IN THE EFFECT ON β -CELLS

Kalyn Yasutake, Donald Stapleton (Mentor), Biochemistry

Insulin, a necessary hormone, lowers the blood sugar content. Unfortunately, individuals with Type II diabetes do not respond properly to insulin and therefore require a greater amount but are unable to produce the extra needed. This study investigates the overexpression of twelve different genes in diabetic and nondiabetic islet cells to observe whether they promote reproduction of pancreatic β -cells which produce insulin. The genes are created into adenoviruses that are used to infect islet cells and cause the gene to be overexpressed. Comparing islet cells of the overexpressed and regularly expressed gene determines whether an increase in β -cells occurred. By identifying genes that when overexpressed promote the reproduction of β -cells can provide individuals with Type II diabetes the ability to make the extra insulin needed.

EPIGENETIC EFFECTS IN THE REGENERATION OF THE CENTRAL NERVOUS SYSTEM THROUGH THE FOLATE PATHWAY

Clara Ye, Bermans Iskandar (Mentor), Neurological Surgery

The ability of the mammalian central nervous system to regenerate axons after injury tends to decline significantly after birth, rendering many CNS injuries or neurodegenerative diseases incurable. Using spinal cord injury models, the Iskandar lab found that folic acid (FA) treatment immediately before and after injury is effective in the regeneration of the adult central nervous system. FA improves regeneration in the CNS by activating DNA methylation, and experiments have shown that this effect may be trans-generational. Since folate has trans-generational effects in the regeneration of the CNS, meaning that it has permanently affected the germline, it should also be effective when a two-month period of time is allowed to lapse between FA treatment and injury. The purpose of our study is to test this hypothesis using our well-established animal models of CNS injury. If the injured CNS can regenerate when treated with FA in the remote past, this may indicate that folic acid has a long-term effect that is beneficial to the repair of the CNS.

**EXPLORING THE INFLUENCE OF TWITTER
CONVERSATIONS ON CONSUMER OPINIONS AND MICRO-
NETWORK DEVELOPMENT**

Zachary Zaban, Dhavan Shah (Mentor),
Journalism and Mass Communication

Microblogging service Twitter provides Internet users a space to voice their opinions within social networks in a real-time environment. Businesses may be aided from a better understanding of how social media instantaneously both reflects and influences opinions about products, services or brands. Our research seeks to explore the underlying processes of these interactions. Using contextual mining software, this study will analyze specific hashtags and usernames of companies in Twitter messages, or tweets. Content and network analysis will be used to see if micro social networks develop and if so, how influential ideas spread within them. We hypothesize that micro-networks will develop within 24 hours and that the viewpoints of some users will serve opinion leaders with high reach and content duplication through the use of a re-tweet.

**3'-UTRS OF SELECT YEAST GENES TARGET
TRANSCRIPTS FOR NONSENSE-MEDIATED MRNA DECAY**

Bethany Zeitler, Michael Culbertson (Mentor), Genetics

Nonsense-mediated mRNA decay (NMD) is a mechanism used by cells to regulate the stability of protein-coding mRNAs. One of the ways in which certain genes are targeted for this pathway is through sequences or structures in the 3'-untranslated region of the mRNAs. The molecular basis of this targeting mechanism is currently unknown. To determine which mRNAs are targeted in this way, we are fusing green fluorescent protein (GFP) to the 3'-UTR sequence. By measuring the levels of fluorescence in wild-cells and cells where NMD is inactivated, we will determine whether the 3'-UTR is important in targeting.

THE PENGUIN BOOK OF HAIKU

Stephen Zellmer, Adam Kern (Mentor),
East Asian Languages and Literature

In the vast English-language literature on the Japanese poetic form known as haiku, a “grand narrative” has emerged that has significantly distorted haiku in its historical context. This “grand narrative” had defined haiku as an ancient art with strict requirements, such as a 17-syllable format, seasonal imagery, and Zen influence. Our project seeks to challenge this “grand narrative” and provide a more historically grounded view of haiku. Through analysis of works in English devoted to haiku and related poetic forms, I worked to expose both this “grand narrative” and the scholarship that challenged it. The presentation will address these misconceptions about haiku, discuss how they came to be historically, and confront problems of translation that have risen from these misconceptions.

CHAOS IN THE THREE-BODY COULOMB PROBLEM

Vladimir Zhdankin, Julien Sprott (Mentor), Physics

Chaos theory is the study of dynamical systems that exhibit sensitive dependence to initial conditions. Even though chaotic systems obey deterministic laws, they are unpredictable over long periods of time. It is well-known that chaos occurs in complex systems such as the weather, but it can also be observed in very simple systems. This talk describes the three-body Coulomb problem, in which three electrically charged particles interact through Coulomb’s law. Among other things, this can represent a classical model of the helium atom. Numerical solutions to this problem are presented and it is found that the general case has a transient chaotic phase before becoming unbounded. However, bounded chaotic orbits can exist if the initial conditions satisfy a special symmetry.

PREVENTION OF BIOFILM FORMATION USING HYDROLYTICALLY DEGRADABLE POLYAMINES CAOTINGS

Zhou Zhong, Yejin Eun (Mentor), Biochemistry

When bacteria attach to a surface, they can develop into biofilms and exacerbate an infection. To find novel methods for reducing biofilms, we have investigated the use of poly-beta-amino-ester (PBAE) as a degradable coating. PBAE coating can erode over time with attached cells and biofilms; thus we hypothesized that the coating can reduce biofilm development. To test this hypothesis, we optimized the biofilm growth in plastic chambers with glass surface. Preliminary results show that cells form mature biofilms within 20 hours. Using these conditions, we plan to compare the coated surface to glass by measuring the fluorescence from cells. We expect that PBAE chambers will have less biofilms. We envision that this approach will provide a simple way to control biofilms on medical devices.

UPSTAR: RESEARCH ON RESEARCH

ShengBo Zhou, Eva Gandhi, Lori Bakken (Mentor),
Interdisciplinary Studies

Undergraduate Perceptions of Science Training and Research (UPSTAR) aims to challenge the basic science paradigm and to investigate undergraduate students' perceptions, values, and career expectations of science research. The current, preliminary phase of the project involves recruiting undergraduates majoring in biomedical sciences and conducting three focus groups—one female, one male, and one mixed—that are asked six open-ended questions on science research. Recordings of the focus groups are transcribed, coded, and analyzed in order to address the objective stated above. The broader approach of this project involves more focus groups and a cross-sectional survey that will expand undergraduate research learning experiences. This new design may broaden research opportunities to include more clinical and community-based research activities.

INVESTIGATION OF ROLE AND LOCALIZATION OF DSK2 PROTEIN IN THE PROTEIN DEGRADATION PATHWAY- AUTOPHAGY

Yinzhou Zhu, Faqiang Li (Mentor), Genetics

In eukaryote, UBA/UBL domains containing protein DSK2 (Dominant Suppressor of Kar2) mediates delivery of polyubiquitinated proteins to the proteasome for degradation. Recent studies in mammals also have showed that DSK2 is involved in autophagy to removing protein aggregates. To characterize its role in plants, we are exploring the localization of DSK2 in Arabidopsis. Hypothesis of two potential pathways are: the DSK-polyubiquitinated protein complex moving together into vacuole and subsequently get degraded; or upon arriving at the vacuole, DSK2s get recycled for reuse. To find out, a transgenic line containing selection marker and DSK2b that is fused to a Fluorescent gene will be generated and the subcellular localization of DSK2a will be investigated using confocal microscopy. The role of DSK2 in autophagy will also be examined by co-localization with available autophagic markers such as GFP-ATG8 and GFP-ATG5.

EFFECTS OF COMMON BUCKTHORN INVASION AND RESTORATION ON WOODLAND CARBON SEQUESTRATION

Chad Zirbel, Jacquelyn Gill (Mentor), Geography

We measured the effects of *Rhamnus cathartica* (common buckthorn) invasion and restoration of previously invaded areas on woodland carbon dynamics. Carbon storage is an important ecosystem service performed by natural habitats that can reduce concentrations of climate-changing greenhouse gases. Ecological restoration can increase the biodiversity of degraded habitats, but can it also increase the ability of ecosystems to store carbon? We measured carbon storage in the soil, carbon loss through CO₂ flux and soil erosion, and plant-community composition and litter biomass as indicators of habitat structure. Our data suggest that buckthorn invasion may decrease and restoration increase carbon storage in woodlands.

LIDS

Liana Zorn, Stephen Hilyard (Mentor), Art

LIDS is an animation created in Maya and After Effects as an introductory exploration of character animation. My idea was to create a character with limited expressive abilities to show emotions and reactions with dynamic movements and an entertaining and fun story.

UPSTREAM TRUNCATION OF DNA AIDS IN CHARACTERIZATION OF RNA POLYMERASE ASSOCIATION MECHANISM

Kristin Zorn, M. Thomas Record Jr. (Mentor), Biochemistry

The kinetics of transcription initiation by *E. coli* RNA polymerase (RNAP, subunit composition $\alpha\alpha\beta\beta'\omega\sigma^{70}$) are strongly mediated by protein-DNA interactions upstream of the -10 and -35 regions of the promoter DNA. In the near-upstream region (base -40 to -64), promoter binding by the carboxy-terminal domains of the α subunits (ACTDs) is shown to be necessary for both association and isomerization to the transcription-competent open complex RPo. Further upstream interactions are also important for the isomerization step, but the mechanism is unknown. Filter binding and footprinting experiments with λ PR promoter DNA truncated at upstream basepair 65 help in the investigation of the mechanism of RNAP transcription initiation. The temperature dependence of association allows for isolation and characterization of the intermediates of the mechanism.

FACEBOOK'S EFFECTS ON SELF-ESTEEM AMONG COLLEGE FEMALE FRESHMEN

Hallie Zubella, Megan Moreno (Mentor), Pediatrics

Low self-esteem is associated with mental illness. Facebook is widely used among adolescents, particularly females. Freshmen females were recruited from a university dorm: twenty were surveyed using Likert scales (0=unlike me, 5=very like me); ten were interviewed to explore effects of Facebook on self-esteem. On average, participants made 45 Facebook friends in the first six-week period of college and made nine friends in the six-week period prior to dorm life. Ninety percent reported feedback on Facebook boosted their self-esteem. Participants reported increased self-esteem when people post positive comments on their Facebooks (4+/- .78). However, participants suggested it's somewhat like them to feel jealous when they see Facebook pictures of people having fun (3+/-1.56). The college community should be educated about Facebook's effects on self-esteem to improve students' well-being.

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