Seventh Annual Celebration of Academic Excellence

Wednesday, April 6, 2011
Center for the Arts
Student Amber Kieffer
Major Environmental Design
Research Mentor Alex Bitterman, Ph. D.

Title
Buffalo Landmarks: The Rand Building

Abstract
Buffalo can boast about a number of buildings designed by prominent American architects. The city takes pride in its great architecture and historical preservation of these places. Buffalo’s third tallest building, however, has fallen into the shadows. The Rand Building was constructed in the late 1920’s and is a wonderful display of the Art Deco style, but is often overlooked in the city skyline, especially at night, because it has had no exterior lighting for roughly 30 years.

Student Michael Puma
Major Environmental Design
Research Mentor Alex Bitterman, Ph. D.

Title
The Marcy Casino at Delaware Park

Abstract
“Situated on the picturesque Hoyt Lake in the heart of Olmsted’s Delaware Park, the Macy Casino is a great place to host any event or private party. The original building, built by Calver Vaux burned in 1900, but a new building was constructed by E.B. Green in 1901. It was majorly altered in 1961 and was thankfully redesigned in 1990 to be representative of both Green and Vaux.”

Student Mikaila Waters
Major Architecture
Research Mentor Nicholas Bruscia

Title
Digital Craftsmanship

Abstract
As rapid prototyping and digital fabrication become more popular within the field of design, craftsmanship and hand-made objects have attracted attention and increased in value due to the nature of their existence. Since hand-made objects are automatically embedded with human error, they carry a reference to time and energy that does not exist with machine produced products. The project looks to develop a sense of craft using the CNC router, a tool normally not associated with artisanship due to its computational manner, as well as the possibility of forcing an error from the machine (essentially the digital version of a human-error) which would create unique products out of the same file and process.

Student Lisa Alagna
Major Mathematics
Research Mentor Dr. Brian Spencer

Title
Light Rail Transit: Effects of an Expansion

Abstract
Public transportation can be beneficial to a community by the convenience it provides, including a cheaper alternative to daily vehicle travel and a reduction in traffic congestion. The purpose of this research is to determine the effects an addition to the current light rail line in Buffalo, NY would have on the city, its suburbs and the University at Buffalo. The main route investigated would run from the existing South Campus station to the University at Buffalo, North Campus. Data involving light rail lines from other cities similar in size to Buffalo as well as current transportation data for the area were used in determining the benefits of an extension. It has been found that the permanence a light rail provides as well as other economic benefits would greatly improve the city of Buffalo as well as work to incorporate the city with its suburbs.

Students Michael Barattini & Kara Tripoli
Major Theatre and Dance
Research Mentor Dr. Nathan Matthews

Title
Music Theatre Research and Performance

Abstract
This January, we traveled to Towson, MD to participate in the Kennedy Center American College Theatre Festival (KCACTF), and compete in the Irene Ryan Competition. This experience provided us the opportunity to pursue the
exploration and implementation of acting, singing, and collaborative methods on stage and in a conference/festival setting. Out of about 250 auditioning pairs, we were fortunate enough to advance to the semi-final round of only 32 pairs. We gained invaluable insight from the judges and workshops, and were able to bring that information back with us to UB and enrich the education of our peers.

Student  
Rachel Berkeley  

Major  
Physical Anthropology  

Research Mentor  
Dr. Philips Stevens  

Title  
The Potential Misclassification of Reactive Attachment Disorder as a Psychiatric Illness  

Abstract  
Reactive attachment disorder (RAD) is classified by the American Psychiatric Association as a psychiatric disorder. The diagnosis criteria for RAD are notoriously ambiguous and cognitive-behavioral and pharmacological therapy have poor rates of success. The indiscriminate form of RAD is classified as an attachment disorder which may occur after a child loses their parent or caretaker and are not immediately provided with an appropriate replacement. From an anthropological viewpoint the symptoms of RAD resemble the instinctual response many immature primates display after losing their primary caretaker. This type of attachment behavior in humans may be a suppressed instinctual response to a traumatizing event geared toward the ultimate evolutionary goal; the survival of the child. By viewing this type of attachment behavior as natural and instinctual and not labeling the child as disordered or abnormal we may begin to develop new strategies for the successful re-integration of the child into a family environment.

Students  
Maxwell Bileschi and Dan Padgett  

Research Mentor  
Dr. Thomas Cusick  

Title  
Biting Boolean Functions  

Abstract  
We study degree 3 Boolean functions in n variables which are rotation symmetric, that is, invariant under any cyclic shift of the indices of the variables. These rotation symmetric functions are important in fast cryptographic hashing. In 2002, Cusick and Stanica gave a recursion for the truth table and a nonhomogeneous recursion for the (Hamming) weight of the homogeneous cubic rotation symmetric function generated by the monomial x_1x_2x_3. Until now, this was the only investigation of the recursive structure of such functions. Here we provide an algorithm for finding a recursion for the truth table of any cubic rotation symmetric function generated by a monomial, as well as a homogeneous recursion for its weight as n increases; in doing so we greatly reduce the complexity of a problem that was previously exponential in the number of variables, and provide a new way of studying the structure of the functions.

Students  
Marissa Bland, Chris Dor, Frank Fonseca, Hyucksoo Kwan  

Research Mentor  
Dr. Frank Tutzauer  

Title  
Prisoner’s Dilemma Tournament with Side Payments  

Abstract  
The Prisoner’s Dilemma is a classic scenario in Conflict Theory. It conventionally consists of two players who can either choose to cooperate (C) or defect (D). Mutual C results in 3 points for both players, but C-D awards the solo D with 5 points and the opponent is awarded none. However, mutual D’s award only 1 point to each player. Side payments assume a new payoff matrix where solo D now receives 8 points. However, 4 points are given to the sucker when side payments are given.

Students  
Nicole Cappiello, Adrian Finch, & Jadine Laniado  

Major  
Communication  

Research Mentor  
Mary B. Cassata, Ph.D., Amanda Damiano  

Title  
Hyperreality: The Reality of Reality Television  

Abstract  
Hyperrealism is the inability to decipher between what is real and what is not real. We can get a very false sense of what is happening, and how the world truly does operate in reality television. This is especially a concern for today’s impressionable youth, (ages 12-18). With many of the popular television shows for
youth being reality shows, teenagers have an extremely distorted view of reality and in whom they put their trust in to establish as their role models. We are proposing a study to determine how reality television affects youth’s perception of how life actually is. We will set up five focus groups, with a total of forty teenagers, and ask questions about their beliefs and attitudes towards reality television. We will examine MTV’s The Real World, Jersey Shore and The Hills. We expect to find that youth have a difficult time understanding what, if anything, about reality shows is real.

Students
Calvin Cheah, Amit Debnath, Brian Quinin, James Susice

Research Mentor
Dr. Frank Tutzauer

Title
The Strategic Evolution of Strategies

Abstract
The main goal of our research is to observe how strategies perform in games other than the Prisoner’s Dilemma over multiple generations. Each game was run only once on WINPRI.exe because WINEPRI.exe calculates the evolution of strategies until it detects that there is no more change. For example, if the TFT strategy, after 80 generations, wins 75% of the time, and TF2T consistently wins the remaining 25% of the time, WINEPRI.exe will stop computing the results as everything after generation 80 will show the same result (TFT winning 75% of the time, and TF2T winning the remaining 25%, and all other strategies having died out). After recording the results from each game tested, we calculated the percentage of each winning strategy. Using this data, we can base a conclusion on which strategy is best in the long run for each of the games tested. We found that the two strategies Random and Complex, which defected on the first move, are suitable for Hero. At the end of each evolution, Spite, Defect, Gradual, and Mistrust became extinct. In conclusion, the strategy TF2T was the most successful over multiple games. Also, in general, “nice” strategies tend to perform better in most situations.

Student
Junhong Choi

Major
Physics

Research Mentors
Piero Bianco, Ph. D

Title
Optical Trap Alignment and Calibration for Force Measurements Using Viscous Drag

Abstract
Optical tweezers, or optical traps, have become a versatile tool in the biological sciences. It can trap or “tweeze” objects in the nanometer (m^(-9)) to micrometer (m^(-6)) size range, which lets experimenter study the behavior of single molecule at easy. This became one of the most successful single-molecule techniques used in biological science, due to its preciseness, ability to trap various small objects and ability to measure forces acting on small objects. In this poster, the various methods used to align optical tweezers are demonstrated. The, the method used to calibrate force measurement using viscous drag experienced by a small objects is shown. The careful alignment of the optical traps combined with the system calibration, will be used to measure stall forces for the translocating RecBCD enzyme.

Student
Kwan Chun Pui

Major
Physics

Research Mentor
Dr. Sambandamurthy Ganapathy

Title

Abstract
This project focuses on developing a challenging fabrication method to individually connect nanometer-sized devices to study electron transport properties in novel condensed matter systems such as single crystal nanowires and nanobeams. In this method, nanowires of samples are first disbursed on an insulating substrate and their position individually marked using optical or electron microscopy. Once the single nanowires are identified, electrical contact patterns are designed using AutoCAD, and then uploaded into NPGS program. This program communicates with the electron beam lithography set up inside an SEM to write the pattern. Electron beam evaporation of contact material (typically gold) is then used to connect single nanodevices. Devices resulted from this method and transport properties of materials such as vanadium oxide and bismuth telluride nanowires will be presented.
South American mints in the origin of the Hawaiian radiation. Phylogenetic analyses of AFO suggest that North America may have been colonized twice by Old World Stachys and that the South American mints represent a diversification separate from the Hawaiian lineage.

Abstract
The objective of this study is to discover if there is one type of strategy that does well in all of the games. The way the study was carried out was that a two tournaments were played for each game; the first with 17 strategies and the second with only the strategies that survived any one game. We drew our conclusions based off of the results of the second tournament for each game and then compared the results of each tournament. We found that there was no strategy that was best for all of the games, but what we did find was that in prisoner’s dilemma and assurance, it was better to play a “nice” strategy and in chicken and hero, it was best to play a “mean” strategy. “nice” denotes that the strategy is more inclined to cooperate and “mean” denotes that the strategy is more inclined to defect.

Student
Abigail Coulter Paul

Major
Communication

Research Mentor
Debra Kolodczak, Ph.D.

Title
Personifying Medical Humanities

Abstract
When humanist principles guide a physician’s practice it improves the possibilities for patient recovery and supports a pro-active lifestyle that sustains good health. These principles are at the heart of Medical Humanities.
significant Rumination x Actual:Ideal Discrepancies, Rumination x Expectations of Ideal Guides, and Rumination x Importance of Feared Guides interactions predicting depressive symptoms. Greater Actual:Ideal Discrepancies, lower expectations of attaining ideal guides, and higher importance of feared self-guides each predicted depression more strongly among individuals who engaged in greater amounts of rumination compared to those who engaged in less rumination. The current study suggests that rumination amplifies the depressogenic impact of Actual:Ideal Discrepancies, low expectations for attaining ideal self-guides, and holding feared self-guides seen as personally important.

Student
Kyle Devine, Peter Kuchera, Chris Peterson

Research Mentor
Dr. Frank Tutzauer

Title
Network Structure and Cooperation

Abstract
In order to see how network structures influence cooperation in the prisoner’s dilemma we sampled various arrangements of nodes and their relationships. The two strategies of all-cooperation and all-defection were used to see if cooperation would flourish. After each generation, any given node would take on the highest scoring strategy between itself and its neighbors. The temptation payoff, b, is changed to see how it will determine whether cooperation flourishes, defection flourishes, or if a stalemate occurs where all nodes keep the previous strategy. We completed numerous tournaments with different temptation payoffs and recorded the results according to a range of b-values.

Students
Michelle Dumont, Emily Gibson, & Michael Rudroff

Research Mentor
Mary B. Cassata, Ph.D., Amanda Damiano

Title
Do Social Networking Sites Increase Voter Turnout Among Youths?

Abstract
The interactive and mobilization abilities of social networking sites (SNS) are believed to increase youth voter turnout. In the 2008 general elections, after the rise in popularity of SNS, there was only a 2.4% increase in youth voter turnout from the 2004 elections. We believe the increase was insignificant because SNS do not motivate youths to utilize them for political activity. Through administering a survey we expect to find that only youths who have previously displayed an interest in politics, such as through involvement with a political club, will respond that they use their SNS accounts to extend their political participation. Thus, we would not expect that SNS increase voter turnout among youths.

Students
Robert Dygert, Matt Heavner, Devanshu Pandey, Michael Skvarc

Research Mentor
Dr. Richard Gonsalves

Title
2-Diregular Multi-Graphs: What they are, How we make them and Why we care

Abstract
We generate multi-graphs with very specific properties that have applications in condensed matter physics. The number of graphs increases exponentially with the number of vertices. This in turn leads to an explosion in the size of computation. We turn to parallel computation to ameliorate this situation. We implement our solution on the cluster at UB’s Center for Computational Research using Python and MPI. We find that there are 2,975,850,329 graphs of order 14. We are currently calculating order 15 graphs, which would require an estimated 84 years if run on a single processor.

Students
Peter Pardoun, Chloe Lake, Brent Scofield

Research Mentor
Mary B. Cassata, Ph.D., Amanda Damiano

Title
The Skinny on Weight Loss Reality Television: Do Viewers Adopt Lifestyle Changes?

Abstract
The popularity of weight-loss reality television shows has prompted the question; do these shows actually influence viewers to alter their lifestyles? With more than 100 million Americans over the age of 20 either overweight, obese or morbidly obese (http://www.getamericafit.org/statistics-obesity-in-america.html), ways to reduce this number need to be investigated. Lifestyle reality television shows, such as “The Biggest Loser” focus on weight loss and lifestyle intervention. These shows offer participants tools and resources that encourage weight loss, along with the adoption of healthier lifestyle choices. Do these shows motivate viewers to make parallel changes? If so, are these changes maintained? We will collect data from reality television viewers of any age regarding the influence of weight loss shows on their lifestyle through interviews and surveys. Based on current research, we expect to find that people adopt healthy changes during the duration of the show, but that changes are not maintained.

Student
Grady Gambrel

Major
Physics

Research Mentor
Bruce D. McCombe, Ph.D.

Title
Spin Effects in Quantum Hall Edge Channels and Quantum Wires

Abstract
There is great interest in using intrinsic spin of carriers in semiconductors in new paradigms for electronic devices and circuits, and for quantum computation and information. A collaborative research project involving Professor McCombe’s laboratory at the University at Buffalo and Professor Saskia Fischer’s laboratory at the Humboldt Universitaet zu Berlin seeks to improve understanding of the effects of spin-orbit interaction in Quantum Hall Edge Channels and Quantum Wires, to discover new phenomena, and to explore the possibility of exploiting results in spin-based devices. The Berlin group is focusing on fabrication of Hall bars, Quantum Point Contacts and Quantum
Wires on InAs-based quantum-well structures for exploring effects of spin-orbit interaction on electrical properties. The Buffalo work concerns terahertz magnetospectroscopy of the effects of spin-orbit interaction on the electron spin resonance of these structures. Results will improve understanding of spin-orbit effects and may help inspire new spin-based technologies.

Student  
Rachel Gaydosh  

Major  
Psychology  

Research Mentor  
Mark D. Seery, Ph.D.

Title  
Self-Esteem Stability and Romantic Relationships  

Abstract  
Self-esteem has been shown to influence a number of variables in romantic relationships such as closeness, satisfaction and commitment. However, recent research has found a number of differences among those within a given level of self-esteem. For example, high self-esteem (HSE) has been associated with defensive reactions, which appears to contradict the multitude of benefits both endorsed by society and found in previous literature regarding romantic relationships and HSE. Research in our lab has shown that those with fragile HSE (vs. secure HSE) tend to employ defensive strategies, suggesting that the defensive reactions among those with HSE may be driven by those with fragile HSE in particular. To further investigate the effects of fragile and secure self-esteem in romantic relationships, we assessed physiological responses while participants gave a speech to their romantic partner after receiving a relationship threat vs. not. Results revealed a marginally significant 3-way interaction between relationship threat condition, self-esteem level, and self-esteem fragility. These results may suggest that two very different responses can emerge within the same high level of self-esteem in the context of close relationships, which has implications for understanding the complexities of romantic relationships.

Student  
Alyssa Geisler  

Major  
Psychology  

Research Mentor  
Dr. Shira Gabriel

Title  
Social Threat Increases the Favorability of a Comfort Food among the Securely Attached  

Abstract  
Previous research has demonstrated that “comfort food” can fulfill a sense of belonging by serving as a reminder of close others. I examined if people’s existing mental representations of close relationships (i.e., their attachment style) would influence their evaluations of a comfort food after a social threat. I hypothesized that, if comfort serves as a reminder of close others, those who are securely attached and have positive relationships with others, should evaluate a comfort food more positively after a social threat. One hundred-thirty participants completed a measure of attachment styles and wrote an essay about a fight with a close other or a control essay. Participants then consumed a sample of potato chips and completed evaluations of them. As predicted, among participants who received a social threat, only those with a secure attachment style evaluated the potato chips more favorably. Implications for how comfort foods and close relationships might influence eating behavior are discussed.

Student  
Marissa Green  

Major  
Psychology  

Research Mentor  
Dr. Shira Gabriel

Title  
Avoidance of intimacy and friendships: How friendship aspects affect physiological responses  

Abstract  
The present study sought to determine the ways in which avoidance of intimacy, developed from the infant-caregiver bond, dictates psychological experiences (i.e., evaluations of personal resources versus situational demands) when people are asked to assimilate versus contrast on either core or superficial friendship qualities. This was assessed using the biopsychosocial (BPS) model of challenge and threat, which holds that a constellation of cardiovascular responses (i.e., EKG, impedance cardiography, blood pressure) can be used to measure challenge/threat motivation states during task performance that stem from one’s evaluations of demands and resources. Based on previous research, because non-avoidants are more comfortable with and seek out intimacy, they should experience challenge (evaluate higher resources and lower demands) when asked to assimilate on core values versus superficial traits. Conversely, because avoidants are less comfortable with and avoid intimacy but still develop and maintain friendships, they should experience challenge when asked to assimilate on more superficial traits versus core values. The opposite pattern of results should occur when they are asked to contrast on core values versus superficial traits. This study extends previous research to provide further insight into how intimacy avoidance affects the ways in which one is comfortable in friendships.

Student  
Rebecca Hager  

Major  
Mathematics  

Research Mentor  
Chris Andrews

Title  
Multivariate Analysis of NMR Data to Assess Embryo Implantation Potential  

Abstract  
During in vitro fertilization, the embryo grows in media before it is transferred to the woman. For three days of growth, the embryo interacts with the media. My goal was to predict whether an embryo will implant in a woman during in vitro fertilization based on changes in this media. The media is analyzed using Nuclear Magnetic Resonance (NMR) spectroscopy, which produces a spectrum of the concentrations of many different metabolites (small molecules)
in the media. I used different statistical techniques, such as partial-least squares regression (PLS), principal component analysis (PCA), and k-nearest neighbor (KNN) to analyze this data. Partial least squares regression and principle component analysis are helpful to decrease our thousands of variables from the spectra to describe the data in a few variables. K-nearest neighbor predicts the status of an embryo by looking at the information of neighboring sample data points in the variable space. All analyses use cross validation to not over fit a model based on the sample data we have. Using all of these techniques, we have not found a reliable association between this spectra data and implantation status.

Student
Gary Iacobucci

Major
Biological Sciences

Research Mentor
Shermali Gunawardena, Ph. D.

Title
Characterization of Axonal Transport in a Drosophila Neuronal Cell Culture System

Abstract
The treatment of human neurodegenerative diseases has gained increased attention as their prevalence continuously is on the rise while effective treatment and knowledge of their origins remains unclear. The pathology of these diseases is characterized by a selective loss of neural tissue and the accumulation of proteins in plaques or inclusions. Despite the growing literature in the study of neurodegeneration, the underlying causes are largely unknown and a more comprehensive understanding of the disease pathways is needed for the development of effective treatment. Recently, defects in axonal transport have been implicated as an early event in neurodegeneration. This pathway is essential for highly polarized cells, like nerve cells, which rely heavily on efficient intracellular transport of vital protein cargoes for healthy function and structural integrity.

To determine how axonal transport defects are initiated, we have developed a Drosophila neuronal culture system to visualize, live the movement dynamics of several cargo proteins that are transported within the axon; fluorescent tagged synaptic vesicle proteins and mitochondria. Using this system we have generated several movies from day 1 and day 2 old cultures. For all of these cargos we observe dynamic bidirectional movement within neuronal projections. We track and analyze the movement behavior of these cargos by generating kymographs from 15 second movies. In some instances we find axonal blockage assembly, disassembly and reassembly suggesting that these pathological blockages are more dynamic than previously thought using static and fixed immunolocalization experiments. To further determine axonal defects we generated cultures from larvae containing motor protein mutations in Kinesin and Dynem. As expected, we find reduced motilility and increased number of blockages in these cultures. These cultures also show a decrease in neuronal projection growth. Thus our method enables us to better understand the dynamic nature of axonal defects and to investigate how axonal defects are initiated in vivo.

Student
Victoria Jaynes

Major
Chemistry/Biomedical Sciences

Research Mentor
Dr. Steven Diver

Title
Explaining Diastereoselectivity in Enyne Metathesis

Abstract
Diastereomerically pure akenes are used in enyne cross metathesis with terminal alkynes to display the differences or similarities that the metathesis reactions would produce. Stereochemistry in the alkene reactant may affect the enyne metathesis reaction. Running an enyne metathesis reaction with a syn alkene and an anti alkene and crossing them with an alkyn would give insight into what stereochemistry is preferred in reactions and which has the highest yield of product.

Student
Megan Kinsley & Amanda Woods

Research Mentor
Jody Biehl

Title
60 Years of The Spectrum

Abstract
We are creating a photographic history of the Buffalo community and the University at Buffalo by compiling photographs and articles from The Spectrum archives. These records show the evolution of the university from a small, single-campus private college in the 1950s through the revolutionary period of the 1960s and 1970s, including campus protests, to the shift to a public university in the late 1970s and the school's continued expansion today. The archives offer a unique perspective and historical record of this community, of this university, and the private lives of the students who have attended it.

Student
Victoria Kirgesner

Major
Linguistics

Research Mentor
Dr. Jeri Jaeger

Title
English vs. Italian: Prosodics and Syllable Length

Abstract
In this research, data taken from both native English and native Italian speakers was taken, both when reading their native language and the other language, which was acquired later in life. The data was then analyzed to determine whether a speaker imposes the prosodic structure of the native language onto the second language. It also looks to see if the claim that Italian is a “syllable-timed” language can be upheld. Finally, this research touches upon the length of vowels in Italian before geminate consonants, to determine whether they are shortened to compensate for the consonant that follows it, since the geminate consonants are said to have a length double that of a single consonant.
Student
Jeremy Lessard
Major
English
Research Mentor
Karen MacCormack
Title
We The Notorious Pronouns, literary magazine
Abstract
We The Notorious Pronouns, a self-funded literary magazine was released as an anthology with an audio CD at Rust Belt Books on 12/10/10 in order to declare ourselves as a poetic movement. Now, we hope to move forward. The group has expanded to 11 poets, and we are accepting submissions from outside our core group. In addition to printing an end-of-the-semester edition, we are planning two shorter versions of an e-zine featuring mixed-media and collaborative poetry. The printed edition will again be an anthology of local poetry, and there will be a critical essay included to provide context. Ideas for the essay center around postmodernity in our poetry as a way to explore how PM manifests itself consciously and unconsciously in the poetry included. Printing costs are covered by profits from the last issue, but funding would be helpful for our pursuits on the world wide web.

Student
Max Archimedes Levitt
Major
Theatre Design & Technology
Research Mentor
Lynne Koscielniak
Title
Mask In The Theatre
Abstract
In the spring of 2010 I attended USITT; the United States Institute of Theatre Technology. I went under a CURCA grant to study the theatrical use of costume, and specifically the use of Mask. At this year’s Celebration of Academic Excellence I plan on fulfilling my CURCA grant by presenting on what I learned at USITT, specifically the works of W.T. Benda, as well as follow up research into the origins and roots of mask, such as Comedia Dell’arte and Jacques Lacoq. I hope to enlighten many to the beauty and magic of Masked Theatre.

Student
Lauren Little
Major
Anthropology
Research Mentor
Dr. Tina Thurston
Title
Geochemical Survey of Potential Archaeological Sites on an Island in Lake Vättern, Sweden
Abstract
Visingsö Island in Sweden’s Lake Vättern has had continuous settlement since the Neolithic, playing a vital role during the intense political change of the iron-age and early medieval times. The dynamic history demonstrates great potentiality for archaeological research, demanding of archaeological survey. Since the identification of potential archaeological sites on a minimal budget is important for preserving heritage and exploration for future research, the goal of this project was to create a geographic regional map using simple, budget conscious, reconnaissance techniques. To achieve this, a combined approach of using geochemical analysis and Geographic Information Systems was tested as a possible method and applied to sites on Visingsö.

Student
Lauren Little
Major
Anthropology
Research Mentor
Dr. Tina Thurston
Title
Geochemical Survey of Potential Archaeological Sites on an Island in Lake Vättern, Sweden
Abstract
Visingsö Island in Sweden’s Lake Vättern has had continuous settlement since the Neolithic, playing a vital role during the intense political change of the iron-age and early medieval times. The dynamic history demonstrates great potentiality for archaeological research, demanding of archaeological survey. Since the identification of potential archaeological sites on a minimal budget is important for preserving heritage and exploration for future research, the goal of this project was to create a geographic regional map using simple, budget conscious, reconnaissance techniques. To achieve this, a combined approach of using geochemical analysis and Geographic Information Systems was tested as a possible method and applied to sites on Visingsö.

Student
David Lloyd
Major
Psychology
Research Mentor
Jerry B. Richards Ph.D.
Title
Methamphetamine and Nicotine Increase the Reinforcing Value of Ambient Stimuli
Abstract
Introduction: The addictive potential of stimulant drugs such as Nicotine (NIC) and Methamphetamine (METH) may be enhanced by increasing the reinforcing value of stimuli experienced during intoxication. Two experiments were conducted investigating the reinforcing value of a visual stimulus (VS) in rats under the influence of NIC or METH.
Methods: Experiment 1- Rats (n=102) were able to snout poke to produce a VS according to a variable-interval schedule. Prior to each session, animals were injected with either saline or METH (0.5mg/kg ip).
Experiment 2- Rats (n=32) were able to snout poke to produce a VS according to a fixed-ratio schedule that increased across sessions. Prior to each session, animals were injected with either saline, NIC (0.4mg/kg sc), or METH (0.5mg/kg ip).
During experiments three poke holes were available; the ‘active’ hole produced the VS, the others were ‘inactive’.
Results: In both experiments, snout poking into the active hole turned on a light for 5 seconds. Both METH and NIC increased active responding. METH caused significantly greater levels of active responding than NIC.
Conclusion: The addictive nature of stimulant drugs may not be due to inherent properties of the drug alone but instead may be caused by an interaction between drug and ubiquitous environmental reinforcers.

Student
Caitlin McLeod
Major
Fine Arts and Design Tech. Theatre
Research Mentor
Catherine Norgren
Title
Design and Technology Presentation
Abstract
Design is all about the process, how someone goes from reading the play, to a finished product on opening night. The design presentation reflects this. After working for an entire semester on “Cabaret”, a musical performed on the
UB Drama Theatre stage, as the costume and lighting designer – I have a lot of work to share. It will not only express my methods of producing a Scenographic design, but also inspire other artists and their own work.

**Student**

**Derek J. Megger**

**Major**

Communication

**Research Mentor**

Mary B. Cassata, Ph.D., Amanda Damiano, Co-Mentor

**Title**

Bullying Cultivated By Poor Interpersonal Communication Skills

**Abstract**

Research indicates that a range from 30 to 50 percent of middle school age students report being bullied at school (Fekkes et al., 2005; Duncan, 1999). This project will test the relationship between bullying and interpersonal communication effectiveness among parents, students and teachers. While communicative norms are different for cultural and regional groups, testing focused on message cognition can provide the data required to measure network quality.

It is hypothesized that when there is communication disjunction among one of these three groups, students are at a much higher risk for bullying victimization. Studies point out that communication styles differ across cultures, but the cognition and agreement of communicated messages are the project focus. This study will be conducted through surveys grading communication for middle school students. It is expected that victimization will be the highest for students with the poorest network of communicators.

**Student**

**Lyndsey Milcarek**

**Major**

Medical Technology & Anthropology

**Research Mentor**

Dr. Ann McElroy & Professor Robert Klick

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**Title**

Stress Among College Students at the University at Buffalo: An Interpretation of Meaning, Function and Management Among the Undergraduate Student Body

**Abstract**

This purpose of this research project is to determine how stress affects Undergraduate students at the University of Buffalo. The study explores what stress means to the students, how stress affects their bodies and how students have learned to manage their stress. Approximately 70 students were interviewed in an ethnographic manner, using three open-ended questions relating to stress. Qualitative data has been gathered from interviews, including information on sleeping and eating patterns, hours spent on school assignments per week, procrastination patterns, and what forms of stress students find most threatening. Though some students are surprisingly unaffected by stress, this study has proven that a majority of college students still struggle with the management of their stress throughout their entire college career.

**Student**

**Kristin Morris**

**Major**

Biology

**Research Mentor**

Dr. Scott Medler

**Title**

Muscle Organization in Running Crabs

**Abstract**

We compared the muscle composition of ghost crabs (Ocypode quadrata) and their closest living relatives, the fiddler crabs (Uca pugilator). The ghost crab is capable of running at very high speeds (1 meter/s), but relatively less is known about the running abilities of the fiddle crabs. I was interested in comparing the running capabilities of these two species and finding out how the muscles that power running compares in both animals. We have been able to find two major fiber types: large, fast glycolytic fibers, and smaller fast fatiguing-resistant fibers. These are defined by different isoforms of the muscle proteins: myosin heavy chain, troponin T, and troponin I. Ghost crabs are faster runners than the fiddler crabs, in part because they have larger leg muscles.

**Student**

**Sarah Mye**

**Major**

Psychology and Political Science

**Research Mentor**

Dr. Stephen T. Tiffany

**Title**

The Effect of Varenicline on Withdrawal, Craving, and Mood in Treatment-Seeking Smokers: An Ecological Momentary Assessment Study

**Abstract**

Varenicline, a partial nicotine agonist, is effective in helping individuals quit smoking. In the standard treatment program, varenicline is used for one week before the intended quit date. This study compared a longer treatment with varenicline prior to quitting (four weeks) with standard pre-quitting treatment (one week) to determine if the longer treatment would ultimately improve cessation outcomes. This study focused on the impact of this treatment manipulation on nicotine withdrawal, cigarette craving, and mood symptoms. These variables were assessed with Ecological Momentary Assessment, a method that measures participants’ symptoms in their natural environment. Each participant carried a hand-held personal digital assistant (PDA) with them at all times over the course of the study. The PDA delivered multiple questionnaires on random occasions each day in addition to a daily morning assessment. My thesis evaluates whether longer drug treatment has a significant impact on nicotine withdrawal and related symptoms.

**Student**

**Laura Neese**

**Major**

Dance/English

**Research Mentor**

Dr. Ann Nugent

---

$\text{H}$ = University Honors Student

$\text{C}$ = CURCA Funded Project
Title  
Inscribing the Body: an investigation into the Choreographic Theory and Practice of Mary Wigman

Abstract  
My research explores how the political and artistic climate of turn of the twentieth century Germany, specifically relating to gender roles, the rise of Körperkultur, and Expressionism influenced the choreography and theory developed by the “mother of German Ausdruckstanz” (Expressionist Dance), Mary Wigman.

I investigate how the artistic principles of German Expressionism (located ambivalently in the crosscurrents between modernism and primitivism) were fertile ground for Mary Wigman’s cultivation and articulation of a uniquely female artistic voice, which drew upon and departed from the practices of her male choreographic forerunners (Dalcroze and Laban), as well as stood in stark contrast to the romantic ideals of ballet technique and choreography. I showcase the struggle between her “forward-looking” personal drive for artistic and professional independence as an individual German woman and artist (in an era when this was revolutionary), and the socially inculcated “backward” or traditional bourgeois and romantic patriarchal values, which plagued her life and work.

Student  
Arpit Patel  
Major  
Psychology  
Research Mentor  
Mark D. Seery, Ph.D.

Title  
The Effects of Self-Handicapping and Stereotype Threat

Abstract  
Previous research suggests that stereotype threat results in decreased performance among members of a negatively stereotyped group when they are reminded of their stereotype. Self-handicapping—a hindrance of one’s performance that provides an excuse for failure—provides a defensive strategy in response to self-threats. The current study seeks to investigate the psychological experiences that occur when there is an opportunity to self-handicap during conditions of stereotype threat. To do this, cardiovascular responses will be assessed to examine underlying motivational states while Black students take a test and are either under stereotype threat conditions vs. not, and either have the opportunity to self-handicap vs. not. We anticipate that under stereotype threat conditions, Blacks will experience threat (a negative motivational state) when there is no handicap, whereas Blacks will experience challenge (a positive motivational state) when there is a handicap because they will then have an excuse for potential decreases in performance. On the other hand, Blacks under non-threatening conditions should experience challenge when there is no handicap, but threat when there is a handicap because an obstacle that has no utility is detracting from their performance. Implications for these anticipated results are discussed.

Student  
Andrew J. Porter, Jr.  
Major  
Psychology  
Research Mentor  
Dr. John Roberts

Title  
Impact of Ruminations on Implicit and Explicit Self-Esteem: Are Previously Depressed Individuals More Reactive?

Abstract  
In contrast to cognitive theories of depression and research focusing on explicit self-esteem, recent studies have demonstrated that previously depressed individuals have higher implicit self-esteem compared to never depressed controls (e.g., De Raedt et al., 2006). The present study was designed to replicate and extend these findings by testing whether higher implicit self-esteem in previously depressed individuals was the result of these individuals engaging in greater rumination involving either brooding or reflection. According to this hypothesis, ruminative self-focus would maintain activation of self-related mental constructs, which would facilitate the ability to automatically form associations between the self and valenced stimuli.

A total of 61 previously depressed and never depressed undergraduate students completed self-report measures of trait rumination and self-esteem, and the Implicit Associate Test for self-esteem. Consistent with past research, results indicated that previously depressed individuals reported lower explicit self-esteem, t = 2.02, p < .05, but experienced higher implicit self-esteem, t = 1.97, p = .05, compared to never depressed participants (controlling for current depressive symptoms). Although previously depressed individuals also reported higher brooding and reflection compared to never depressed persons (p < .01), Sobel tests failed to find evidence that the association between depression history and implicit or explicit self-esteem was mediated by rumination (all ps > .23).

Student  
Jill Romano  
Major  
Anthropology  
Research Mentor  
Patricia Hammer, PhD

Title  
La Cosmovisión Andina: Past, Present, and Future Perspectives in the Callejón de Huaylas, Peru

Abstract  
Every culture or community has an order for their world, and understanding of where everything fits in and how the world works, as they call it in the Callejón de Huaylas, Peru, the Cosmovision: vision, referring to how something is viewed, and cosmo referring to the universe. My project is an ethnography of the Peruvian Andes. It looks at the “cosmo-vision” of the indigenous people of that area; what their traditional beliefs describe as the role of humans in the universe in relation to nature and the deities. The study explores the foundation of these beliefs as well as any implications for the future, including environmental implications. The research was conducted in June of 2010 in a town called Carhuaz, which is in the valley called the Callejón de Huaylas. The finished project provides a basis for cross-cultural comparisons, perhaps between the area studied and our own culture.

Abstract
In recent research high self-esteem (HSE) has been related to defensive reactions, and thus the benefits are not as widespread as once thought. Self-handicapping is one defensive strategy that can provide an excuse for potential failure and is particularly likely among people with fragile HSE when they have the opportunity to demonstrate excellence. This suggests an easily activated self-doubt that is not seen among those with secure HSE. To investigate the underlying motivations for defensive behaviors among those with fragile HSE, physiological responses were measured as participants completed a self-relevant test with a low likelihood of success while given the opportunity to utilize a handicap versus not. Relative to those with secure HSE, those with fragile HSE should exhibit a threat response when unable to utilize the handicap. However, receiving a handicap should buffer the negative effects of failing to demonstrate one’s excellence and lead to a challenge response. This study allows us to investigate the underlying self-doubt among those with fragile HSE, which may otherwise be difficult to assess. The results of this study will provide insight into the connection between fragile HSE and defensive behavior, specifically in response to the possibility of failing to demonstrate one’s excellence.

Student
Jenna Schultz
Major
Psychology
Research Mentor
Mark D. Seery, Ph.D.

Title

Abstract
This project focuses on poems sent by Emily Dickinson to her friends and relatives- less than twenty percent of her total output. An examination of these poems reveals startling findings such as variations in the number of poems sent in different years, poems occasioned by major deaths, and a shift to using pencil and scraps of stationery for poems after 1866. Critics often describe all of Dickinson’s poetry as a new genre of poetry- the letter-poem- a questionable assertion since Dickinson sent out most poems when she was writing the least. Through an examination of poems sent over the years, this study hopes to provide insight into the occasions and thoughts that resulted in the writing and sending of certain poems, especially when no copies of the poems were retained for Dickinson herself, and in what ways these poems differ from the rest of her work.

Student
Elizabeth Spina
Major
Biochemistry and Mathematics
Research Mentor
Dr. Shermali Gunawardena

Title
Emily Dickinson’s Selective Sharing of Poetry

Abstract
This project focuses on poems sent by Emily Dickinson to her friends and relatives- less than twenty percent of her total output. An examination of these poems reveals startling findings such as variations in the number of poems sent in different years, poems occasioned by major deaths, and a shift to using pencil and scraps of stationery for poems after 1866. Critics often describe all of Dickinson’s poetry as a new genre of poetry- the letter-poem- a questionable assertion since Dickinson sent out most poems when she was writing the least. Through an examination of poems sent over the years, this study hopes to provide insight into the occasions and thoughts that resulted in the writing and sending of certain poems, especially when no copies of the poems were retained for Dickinson herself, and in what ways these poems differ from the rest of her work.

Student
Camille Toarmino
Major
Psychology
Research Mentor
Dr. Micheal Dent

Title
Perceptual Identification of Conspecific Calls by Budgerigars

Abstract
Previous experiments have shown that budgerigars are able to identify calls emitted by conspecifics. However, the amount of a call needed for recognition is unknown. In this experiment, the amount of vocal material required for accurate recognition was investigated. Using operant conditioning techniques, four budgerigars were trained to identify two different conspecific training calls in each of three sessions. Once a bird identified the calls with 85% accuracy, experimental stimuli was included on 20% of the trials where each quarter of each call was played as well as combined quarters (1+2, 1+2+3, 2+3+4, 3+4). On average, the birds did not perceive the combined quarters 1+2 and 1+2+3 as significantly different than the training call. This suggests that the 25% of vocal material is not enough for

Student
Sushmita Sircar
Major
Mathematics
Research Mentor
Dr. Cristanne Miller

Abstract

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Student
Jenna Schultz
Major
Psychology
Research Mentor
Mark D. Seery, Ph.D.

Title

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Student
Elizabeth Spina
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Biochemistry and Mathematics
Research Mentor
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Psychology
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accurate recognition and the information contained in the beginning of the call aids in recognition.

Student  
**Chris Van Patten**  
Major Design & Technology  
Research Mentor Catherine F. Norgren  
**Title**  
DESIGN & TECHNOLOGY PRESENTATION  
**Abstract**  
As a student theatrical designer working in a closed and contained academic environment, the chance to present work to experienced industry professionals for critique is a rare opportunity. Learning from new voices and hearing different perspectives is a key part of the design and technology presentation at the Kennedy Center American College Theatre Festival. I was part of this exciting process, presenting my scenic design for our Theatre & Dance department’s production of the David Mamet play “Oleanna”. I hope to share this same presentation with the academic community at UB, offering first-hand insight into the process of preparing a set design for construction and production.

Student  
**Emily Warren**  
Major Architecture  
Research Mentor Martha Bohm, and Dr. Gardella  
**Title**  
(Re)Solving Waste  
**Abstract**  
This project builds upon the research of “Mapping Waste” by the Urban Design Project, University at Buffalo, which is “Setting the Stage to Clean-up Niagara” as a hazardous waste profile of three counties. In this catalog remediation methods, and a detailed site analysis, leading to a pre-design of on-site remediation for the former Lehigh Valley Rail Road site bordering Tifft Nature Preserve, a 264-acre nature refuge dedicated to conservation and environmental education. This is an educational document for the community to bring attention and interest to cleaning up the sites of Mapping Waste. It details the cycle of how our industrialized history and the system of production has led to the waste we must now resolve. It explores the types of waste and how it affects our populations. Then it details the standards we have for such chemicals and the health effects on living creatures interacting with the waste. Outlining the systems that our government has in place for confronting these problems and the communities reactions will help the reader understand why new systems need to be introduced and implemented. Documenting the methods that exist to resolve these problems is the critical first step towards a more responsible disposal.

Student  
**Matthew Westley**  
Major Physics  
Research Mentor Dr. Surajit Sen  
**Title**  
Cellular-automata based models of survival games  
**Abstract**  
We expand upon a simple model of a battle using a two-species stochastic cellular automaton. This model quickly leads to surprising complexity and rich behavior, especially in battles between two well-matched sides. In this project, we examine global terrain effects upon the outcome of a battle – cities, narrow pathways, and other constraints. We further investigate the consequences to these “symmetric” battles when one side is highly intelligent. Modifying strategy according to the current state of the battlefield (“adaptive strategy”) is found to be extremely effective in winning battles.

Student  
**Priscilla Adjei-Baffour**  
Major Pre-Pharmacy/ Chemistry  
Research Mentor Dr. Folarin Erogbogbo  
**Title**  
Synthesis, Characterization and Evaluation of Chitosan-Coated Silicon Quantum Dots  
**Abstract**  
Luminescent silicon quantum dots (SiQDs) are of great interest due to their suitability for biological applications such as cellular imaging and cancer diagnostics. Although silicon quantum dots have great potential, limitations to their use include acquiring appropriate emission, water dispersibility and biodegradability. Due to the hydrophobic properties of conventional SiQDs, they are not dispersive in water, which is critical for in vivo studies. Steps are then taken to render these SiQDs more biocompatible using semi-polar undecylenic acid for functionalization followed by encapsulation of the nanoparticles with chitosan, a naturally based biodegradable polymer with a safe toxicity profile. The particles are characterized and demonstrated to be water dispersible and suitable for two-photon excited cellular imaging of macrophages. The physicochemical properties of these coated chitosan SiQDs indicate that they can maintain their promise for biomedical applications.

Student  
**Chiamaka Agbsonwe**  
Major Biological Sciences  
Research Mentor Kathryn Medler  
**Title**  
Characterization of a Newly Identified Signaling Pathway in taste cell
Abstract

Taste receptor cells (TRCs) are housed in taste buds that are located on the tongue and within the oral cavity. Transduction of sour and salty stimuli by the TRCs depends on calcium influx through the voltage-gated calcium channels, while bitter, sweet, and umami taste signals are formed in response to the activation of G-protein coupled receptors (GPCRs). GPCRs activate a signaling pathway that depends on calcium release from internal calcium stores which activate a transient receptor potential channel, TRPM5. TRPM5 activation causes neurotransmitter release through a hemi-channel which transmits the taste signal to the brain. Recently, a new population of taste cells in mice that detect bitter, sweet and umami stimuli through a distinct GPCR signaling pathway that does not use TRPM5 was identified. It was hypothesized that the newly identified signaling pathway may use another transient receptor potential channel, TRPM4 which is a close relative of TRPM5, to transduce evoked chemical signals. Molecular and immune-cytotoxic analyses to determine the expression of TRPM4 in mouse taste cells was used. mRNA was isolated from mouse TRCs and analyzed using reverse transcription and polymerase chain reactions (RT-PCR) to determine if TRPM4 is expressed in these cells. The studies have shown that TRPM4 is expressed in TRCs. Understanding the transduction mechanisms of the newly identified signaling pathway will help understand how the peripheral taste system transmits the appropriate stimulus signals to the brain.

Student

Ian Duncan

Major
Mechanical Engineering

Research Mentor
Dr. Kemper Lewis

Title
Development and Design of an Advanced Dashboard for an Automotive Motion Base Simulator

Abstract

Motion based driving simulation is a safe and expedient way to examine research questions that can be performed in a real vehicle. Supplementing automotive simulation with practical peripherals such as an automotive instrument cluster can provide realism to the simulation environment, immersing the user. The use of mechatronics in such a system is a useful tool for adding to the authentication of the simulation environment while adding functionality for the designer. Mechatronics is a multidisciplinary field that incorporates mechanical, electrical, computer, and control systems engineering to implement embedded designs. Through this synergy, the incorporation of an actual automotive instrument cluster can be integrated with the motion base simulator in the New York State for Engineering Design and Industrial Innovation’s (NYSCEDI) lab. This design will lay a foundation for future instrument cluster design and simulation analysis tools used within NYSCEDI, and add significant realism and capability for future vehicle and driver studies.

Student

David Molina

Major
Biomedical Sciences

Research Mentor
Dr. Richard Rabin Ph.D

Title
Investigation of the interaction of ethanol and the pesticide paraquat using PC 12 cells in vitro and zebrafish (Danio rerio) in vivo models.

Abstract

“Humans are routinely exposed to a vast array of environmental neurotoxicants including pesticides and also certain common drug inhibitors like alcohol. Pesticides share the common feature of being intentionally released into environment to control or eliminate pests while alcohol has been known to inhibit certain neurological behaviors in human beings in high alcohol intake. The aim of this study is to examine the influence of the long-term paraquat administration to PC 12 cells and zebra fish (Danio rerio) and alongside ethanol to see if there is a synergistic effect between the two compounds. Evidence from in vivo and in vitro models suggests that pesticides cause a neurodegenerative process that can potentially lead to neurodegenerative diseases. Further evidence in vitro models show paraquat and ethanol in combination causes an even greater effect. For the in vivo model paraquat was microinjected at a dose of 10 mg/kg for 5-7 weeks for an experimental group of n=4 while a control group of n=4 was injected with 10 mg/kg saline. This study will eventually improve the understanding of long term consequences from pesticide exposure in combination with alcohol intake in humans and may be useful in determining amount of pesticides that can cause harm to the general public.”

2011 CELEBRATION OF ACADEMIC EXCELLENCE

SCHOOL OF ENGINEERING & APPLIED SCIENCES

Student
Karl Barber

Major
Chemical Engineering

Research Mentor
Sheldon Park, Ph.D.

Title
ERK2-peptide interaction on yeast cell surface

Abstract

Protein-peptide interactions are common in nature and play important roles in signaling. Therefore, modulating these interactions is a potentially powerful way of controlling cellular events. Here, we look specifically at the ERK2 protein-pepHePTP peptide interaction on the yeast cell surface. Displaying this complex on yeast cells eliminates the need to perform further purification techniques. However, the fast dissociation kinetics of the system makes it difficult to detect the formation of the complex on the yeast surface. To address this shortcoming, we introduced cysteine mutations into ERK2 (T116C) and pepHePTP (V31C) to form an intermolecular disulfide bond. Both the protein and peptide were then labeled with fluorescent markers and analyzed by flow cytometry. We observe that both ERK2 and pepHePTP were successfully labeled, which indicates that the disulfide formation of the system makes it difficult to detect the formation of the complex on the yeast surface. To address this shortcoming, we introduced cysteine mutations into ERK2 (T116C) and pepHePTP (V31C) to form an intermolecular disulfide bond. Both the protein and peptide were then labeled with fluorescent markers and analyzed by flow cytometry. We observe that both ERK2 and pepHePTP were successfully labeled, which indicates that the disulfide
bond significantly helps with the detection efficiency. This technique can be used to screen therapeutic peptides and proteins to disrupt various signaling pathways.

**Student**
Ryan Barton

**Major**
Chemical Engineering

**Research Mentor**
Dr. Carl R. F. Lund

**Title**
Study of Acid Catalyzed Hydrolysis of Fructose and Formation of Humins

**Abstract**
Hydrolysis of fructose can be used to produce levulinic acid which is a platform chemical in industry, and it is a potential feedstock for alternative fuels. This research investigates the kinetics and mechanistic pathways of the reaction. Specifically, the research focus is on undesirable by-products called humins which consist of a complex mixture of organic compounds. The temperature and concentration of acid and other reactants have various effects on the humins formed. The goal is to characterize the humins, and to ultimately find a way to direct the hydrolysis reaction away from the formation of humins, or find another use for the humins. When this goal is achieved, the process to make levulinic acid from fructose (from cellulose) can be more efficient and more easily directed. The substances formed from hydrolysis were characterized using Fourier Transform Infrared (FTIR) spectra analysis, Scanning Electron Microscopy (SEM) and High Performance Liquid Chromatography (HPLC).

**Student**
Alex Borsuk

**Major**
Mechanical Engineering

**Research Mentor**
Dr. Andrew Olewnik

**Title**
Understanding Bicycle Riding Dynamics

**Abstract**
This project aims to study the dynamics of bicycle riding in order to design and build a bicycle riding simulator. A bicycle and rider form a complex system that must be fully understood to design a realistic simulator. In the first phase of this research, a bicycle has been instrumented to measure speed, pedal cadence, handlebar position, 3-D acceleration and 3-D orientation of the bicycle and rider. A comprehensive set of experiments were performed to capture the complex motions of bicycle riding. The sensor data was analyzed to find empirical relationships between the measured quantities. These results, combined with the physical parameters of the bicycle and rider, are then compared to various dynamic models of bicycles presented in literature. This project is currently in progress.

**Student**
Derek Brim

**Major**
Electrical Engineering

**Research Mentor**
Dr. Jennifer Zirnheld

**Title**
The Characterization of Electrochemical Devices

**Abstract**
The main objective of this research is to analyze the characteristics of electrochemical cells. These cells are composed of chemical energy that is converted to electrical energy. Different battery and fuel cell chemistries can be characterized based on their efficiency in terms of power density and energy density. There is no universal answer to which chemistry is the best because certain batteries are more suited to fit specific applications. There are effective ways to visualize the power and energy density, such as formatting a Ragone chart. First a voltage versus capacity graph is analyzed from a discharge test and the energy and power is extracted from that information and formatted in a Ragone chart. From there the Ragone chart shows the limits of each electrochemical device in terms of energy and power.

**Abstract**
Fructose and Formation of Humins

**Title**
The Study of Acid Catalyzed Hydrolysis of Fructose and Formation of Humins

**Abstract**
Hydrolysis of fructose can be used to produce levulinic acid which is a platform chemical in industry, and it is a potential feedstock for alternative fuels. This research investigates the kinetics and mechanistic pathways of the reaction. Specifically, the research focus is on undesirable by-products called humins which consist of a complex mixture of organic compounds. The temperature and concentration of acid and other reactants have various effects on the humins formed. The goal is to characterize the humins, and to ultimately find a way to direct the hydrolysis reaction away from the formation of humins, or find another use for the humins. When this goal is achieved, the process to make levulinic acid from fructose (from cellulose) can be more efficient and more easily directed. The substances formed from hydrolysis were characterized using Fourier Transform Infrared (FTIR) spectra analysis, Scanning Electron Microscopy (SEM) and High Performance Liquid Chromatography (HPLC).

**Student**
May Gin Cheung

**Major**
Industrial & Systems Engineering

**Research Mentor**
Dr. Jun Zhuang

**Title**
The Games Between Oil Companies and the Government

**Abstract**
There was a lot of blame to go around after the BP Oil spill, especially on greedy oil companies and corrupt officials. It’s clear though that they were all players in a high-risk game trying to optimize their own utility. Here we model and analyze the interactions between oil companies and the government in a sequential game of imperfect information and chance. The oil companies themselves also play a simultaneous sub-game with each other in regard to competition, which we will model with prisoner’s dilemma. Each player will have his respective utilities and risk preferences from which they will base their decisions off of.

**Student**
Elizabeth Hennessey

**Major**
Environmental Engineering

**Research Mentor**
Dr. David Blersch

**Title**
The Use of Algae in Pollutant Removal

**Abstract**
The purpose of this research is to investigate the effectiveness and economical viability of using engineered algae cultivation for the removal of pollutants from natural waters. The research is in its early stages and currently involves measuring algae mass to determine the ideal growing conditions, as well as measuring the concentrations of pollutants such as ammonia, phosphate, and nitrate.
Student
Yang Li

Major
Biomedical Engineering

Research Mentor
Chulhong Kim, Ph.D.

Title
Recovery of optical absorption in quantitative photoacoustic tomography

Abstract
Quantitative measurement of optical absorber concentration is extremely important for accurate imaging of in vivo physiological functions such as tumor hyper-metabolism and brain functions. Quantitative imaging of absorber concentrations requires a map of optical absorption coefficients $\mu_a(\lambda)$. Photoacoustic tomography (PAT), however, reconstructs the product of local optical fluence $F(\lambda)$ and $\mu_a(\lambda)$, directly. $F(\lambda)$ is needed to recover $\mu_a(\lambda)$ through $\mu_a(\lambda) = \text{PA signals}/F(\lambda)$. Previous spectroscopic PAT experiments either did not take into account $F(\lambda)$ in image reconstruction procedures or included a correction factor from the measurement on ex vivo tissue. Those methods have limited accuracy and cannot provide satisfactory compensation for quantitative PAT measurement. We investigate the feasibility of the use of ultrasound-modulated optical tomography to compensate optical fluence variation on PAT images. Our Monte Carlo simulation shows that the ratio of PAT and UOT signals recovers the relative optical absorption coefficients.

Student
Michael Sparks  

Major
Mechanical Engineering

Research Mentor
Dr. Jennifer Zirnheld

Title
Various methods to characterize electrochemical cells

Abstract
This project focuses on characterizing various types of energy storage devices including batteries, ultracapacitors, and fuel cells. Previously, the research has focused on using a computerized battery analyzer along with Matlab and Excel to analyze the data to produce gravimetric and volumetric Ragone charts. In this phase of the project, greater focus will be spent on determining internal resistance. Several methods are being investigated including electrochemical impedance spectroscopy. This will ideally reveal a more thorough view of the cell’s internal properties than has been available in the past.

Student
Joseph Mollendorf, Ph.D.

Major
Mechanical and Aerospace Engineering

Research Mentor
Joseph Mollendorf, Ph.D.

Title
Heat Transfer in a Foam Insulated Brick

Abstract
The heat transfer through a common household building block can lead to significant energy losses. By insulating the block with a foam core, heat losses have the potential to be diminished. To determine the extent to which the loss of heat has been reduced, the calculated effective R value, a measure of thermal resistance, of the foam insulated wall can be compared to the calculated effective R value of a standard, non-insulated wall. A transient thermal analysis using ANSYS will indicate the total amount of heat loss through the wall, as well as the effectiveness of the foam as an insulator. It is expected that the foam insulation will decrease the heat loss. Using the results of the study, energy savings over a certain period of time can be found and compared for buildings constructed from these blocks.

15
Title
Empirical Regularities in Patterns of Academic Research Productivity: Insights and Implications from the Information Systems Literature

Abstract
We use a comprehensive dataset, that includes all research publications in 8 leading IS journals over the 1975-2009 time period, to empirically investigate the following interesting question: Do we find evidence of any empirical regularity in the bibliometric distribution patterns of the leading IS journals? We find strong evidence that there indeed exists a very distinct empirical regularity in the bibliometric distribution patterns in the IS discipline. It is the so called Generalized Lotka’s Law of scientific productivity pattern: the number of authors publishing n papers is about 1/nc of those publishing one paper. We also shed insights into: How are such productivity patterns evolving over time? What do those patterns imply about the direction of the IS discipline with respect to phenomena like ‘closed shop’ and ‘fragmented adhocracy’ in academic fields? How do leading IS journals compare to each other in terms of implicit ‘entry barrier’ to publication?

Title
Estimating Egyptian Cotton Field Worker Exposure to the Organophosphorus pesticide profenofos

Abstract
Profenofos is a thiophosphate organophosphorus(OP) pesticide which is used on a variety of agricultural crops. Unlike the more commonly used phosphorothioate OP pesticides, thiophosphate OP pesticides do not require metabolic activation to inhibit B-esterases such as acetylcholinesterase, butyrylcholinesterase and carboxylesterase. Metabolic detoxification of profenofos results in the inactive metabolite 4-bromo-2-chlorophenol(BCP) which is readily excreted in urine and can be used as a reliable biomarker of profenofos exposure. In the present study, Egyptian agriculture workers (n=37) with job titles of pesticide applicator, technician, or engineer, were studied during 8-10 consecutive days of profenofos application to cotton fields. Urinary BCP concentrations were measured daily as a biomarker of profenofos exposure.

Title
Teenage Drivers with ADHD: Effectiveness of Technological Interventions

Abstract
Youth drivers (ages 16-21) have the highest crash rates and violations, drive with greater speed, and commit more driving errors. For youth with attention deficit hyperactivity disorder (ADHD), the dangers on the road are even greater. Barkley and Cox describe a model of driving behaviors that can be targeted in interventions. Interventions include driving simulators and video monitoring systems. When these methods are tested with situations involving alcohol and medication use for teenagers with ADHD, a variety of driving outcomes are observed. Implications for interventions and future directions for research will be discussed.

Title
The Perception of and Resilience to Pain Among Athletes in the Culture of Athleticism

Abstract
Athleticism is composed of its own beliefs, practices, set of values, and societal characteristics; these qualities make it a culture of its own. (Culture: the set of values, conventions, or social practices associated with a particular field, activity or societal characteristic.) Cultures play a big part in how we live, understand the world, and respond to various stimuli. Pain is strongly influenced by biological, societal, and psychological factors. How does the culture of athleticism distort perception of and resilience to pain and pain experiences of athletes? This research project utilized comprehensive questionnaires that were distributed to student athletes and non-athlete students at SUNY Buffalo to gauge how the culture of athleticism affects pain in athletes on a quantitative scale. Interviews were conducted among student athletes and coaching staff to grasp a better understanding of the culture of athleticism and the elements involved.

Title
An Analysis of Neighborhood Perceptions among Residents of Spatially Isolated and High Poverty Areas
Abstract
Racial residential segregation has important consequences for individuals and families. Previous research has documented the ways in which spatial location influences one’s life chances due to differential access to opportunity structures. However, relatively little is known about the perceptions of residents who live in spatially isolated neighborhoods that have high levels of poverty. This study is designed to gain a deeper understanding of how geographic isolation influences individuals and their sense of agency. It’s expected that we will find that geographic isolation impacts the sense of agency of individuals and their communities.

Student
Yun Zheng

Major
Pharmaceutical Science/Medicinal Chemistry

Research Mentor
Dr. Valerie Frerichs

Title
Analysis of Anions in Local Water

Abstract
The sustainability of a healthy ecosystem received greater attention due to recognized climate and industry-related changes. Ion content can serve as a marker of industrial and climate changes, as well as ecosystem health, therefore it is critical to analyze the ion contents in targeted lakes. With enhanced analysis techniques, lower level of critical ions can be monitored. A new Ion-Exchange Chromatographic method has been developed and validated for the simultaneous analysis of inorganic anions from fresh water samples from lakes and streams throughout WNY from 2005 to present. Concentration of two critical markers, chloride and sulfate will be presented from four of these samples sites. Results indicate that even lakes within close proximity have markedly different anion content over a period of five years, indicating different chemistries in these waters that can affect biological and sedimentary changes. With this information, we can begin to determine the local factors that have caused differences in the dynamics and chemical conductivity of these local waters.

SCHOOL OF MEDICINE & BIOMEDICAL SCIENCES

Students
Joshua Adams & Victoria Kordovski

Research Mentor
David and Janet Shucid

Title
The N-Back as a viable test for working memory in human subjects

Abstract
The N-Back has been used as a working memory test in human subjects both in research and clinical work. The test offers the ability to obtain behavioral data related to cognitive functions as well as electrophysiological and fMRI measures. A recent study has shown no correlation between the test and working memory in Parkinsons patients. Statistical correlations between known tests for working memory from lupus study controls and N-Back data from the same study reveal the N-Back test as a viable indicator of working memory. The study validates the N-Back for future cognitive neuroscience research.

Student
Lauren Burkard

Major
Microbiology and Immunology

Research Mentor
Anders Hakansson, Ph.D.

Title
ABC transporters with a lipoyl-domain are regulated by pneumococcal DLDH

Abstract
Streptococcus pneumoniae (the pneumococcus) is one of the main causes of respiratory tract infections worldwide. Our earlier studies have shown that pneumococci require the regulatory enzyme dihydrolipoamide dehydrogenase (DLDH) to survive in the host. In pneumococci, DLDH does not act in its usual role as the E3 component of 2-oxo acid dehydrogenases. Instead it is required for full import of certain substrates, such as galactose and raffinose, through ATP-binding cassette (ABC) transporters. In this study we have further characterized the transport events that are potentially regulated by DLDH.

Student
Emily Deutschman

Major
Biochemistry

Research Mentor
Marc Halfon, Ph.D.

Title
Effects of cis-regulatory module transcription on gene expression

Abstract
Cis-regulatory modules are regions in the genome that regulate genes. Recent data suggest that like their target genes, cis-regulatory modules are also transcribed into RNA. The aim of this project is to test the hypothesis that this transcription correlates specifically with gene expression in the tissue where the CRM is active. Research will be conducted on embryos and larval tissues from the fruit fly, Drosophila melanogaster with primers that represent the selected regions of the genome using quantitative PCR (qPCR). The data generated through qPCR will be used to compare levels of expression between CRMs and their corresponding genes, as well as to conduct cross comparisons between different tissues types. Our data will provide insight into the mechanisms and function of CRM transcription which potentially represents a novel and important mode of gene regulation.

Student
Ezinne Ekwegbalu

Major
Pharmacology & Toxicology

Research Mentor
Fraser Sim, Ph.D.

 Erdoğan = University Honors Student
CURCA Funded Project
Title
Expression pattern of the novel G-protein coupled receptor, GPR155

Abstract
Oligodendrocytes synthesize myelin which permits rapid conduction of action potentials in the CNS. In microarray experiments, we identified G-protein coupled receptor (GPR) 155 as expressed by human oligodendrocyte progenitors. GPRs are integral membrane proteins that mediate signal transduction. We generated two rabbit antibodies against human GPR155 protein and used immunohistochemistry to characterize the expression of GPR155 on 12 day postnatal mouse brain and 20 week fetal human brain. Sections were stained with GFAP, a marker of astrocytes, and DAPI, a marker of cell nuclei. In human brain, both antibodies identified GPR155+ cells in the sub-ventricular zone, a germinal zone comprised of progenitor cells. The majority of GPR155+ cells co-labeled with GFAP. Similarly in mouse brain, we found that GPR155 expression was restricted to GFAP+ cells located within the corpus collosum. These results suggest that GPR155 protein is primarily localized to astrocytes in the developing mouse and human brain.

Student
Courtney Jackson

Major
Biotechnology

Research Mentor
Melissa Grimm

Title
The role of Nrf2 in Allergic Fungal Asthma

Abstract
Allergic Bronchopulmonary Aspergillosis (ABPA) is an allergic response in the lung that results from the inhalation of Aspergillus spores. In this Th2 T-cell response, the release of cytokines leads to the recruitment of inflammatory cells and antibody production. Nrf2 is a transcription factor that leads to the induction of anti-oxidant pathways and serves as cytoprotective against damage.

We hypothesized that Nrf2 not only regulates inflammation, but also directs B-cell antibody responses in ABPA.

In our ABPA model, WT and Nrf2-/- mice were sensitized to Aspergillus over the course of several weeks; followed by a live conidia challenge. Optimization of an ELISA assay to measure Aspergillus specific IgG1 and IgE response in serum was done. Sensitized WT and Nrf2-/- mice showed increased IgG1 levels when compared to unsensitized mice; on day 8 IgE levels of sensitized Nrf2-/- mice were increased compared to sensitized WT mice.

Student
Matthew Jackson

Major
Clinical Laboratory Science

Research Mentor
Sangita P Patel, M.D

Title
Patient Barriers to Cataract Care in South India

Abstract
Cataracts are a significant cause of decreased visual acuity in developing countries with the only treatment being surgery. In many remote parts of the developing world, people remain blind from cataracts, due to a lack of access to quality eye care at an affordable cost. My work aimed to scientifically determine common themes among the barriers to cataract care in south India. A series of basic demographic questions were asked and a brief questionnaire was given that examined various potential patient barriers regarding cataract surgery. These answers were recorded and the patient responses were later analyzed. Potential subjects were those who sought care at Uma Eye Clinic/Unité for Sight outreaches. Patients who were diagnosed as having a cataract(s) by Uma Eye Clinic’s eye doctors were eligible for this study.

Student
Nina Kashanian & Megan Klyczek

Research Mentor
Dr. Denise Feda

Title
Habituation to laboratory stressors, body mass index and food consumption

Abstract
Purpose: To determine the association between individual differences in habituation to stress, body mass index and food consumption.

Methods: Participants (n=30, ages 18-29) completed 2 lab visits. On the stress day, subjects rested for 10 min followed by seven two min subtractions and one 2 min speech (counterbalanced order). Each stressor was followed by a two min rest. Subjects read magazines and matched cards for equal time on the control visit. Session ended with 15 min ad libitum eating. Blood pressure and heart rate were measured throughout the session.

Results: Total calories and calories from muffins were predicted by perceived stress and dietary restraint. Total calories from muffins are associated with change in perceived stress. Change in HR over the session significantly predicted BMI.

Conclusion: Habituation to stress is associated with total calories consumed and BMI. The direction of this association needs further investigation.

Student
So Hyung Kim

Major
Pharmacology & Toxicology

Research Mentor
Dr. Ji Li

Title
The Cardioprotective effects of a Natural Antioxidant- Isoliquiritigenin

Abstract
Isoliquiritigenin (ISL) is a natural antioxidant that derived from licorice compounds and mostly present in foods, beverages and tobacco. There is amount of evidence that reactive oxygen species plays an important role in cardiac damage during ischemia and reperfusion. We test whether ISL can protect heart against ischemic injury via scavenging ROS. The fluorescent probe H2DCFDA was
used to measure the effect of ISL on the level of intracellular ROS and the results proved that ISL reduced the cardiac ROS level during ischemia/reperfusion. Furthermore, the data from Langendorff ex vivo perfused mouse hearts showed much better (89±10%) recovery of the post-ischemic left ventricular contractility with ISL treatment compared to vehicle treatment group (72±8%, p<0.05). In conclusion, ISL is a potential small molecule for treatment of ischemic heart diseases in the future which protects heart against myocardial injury via decrease myocardial ROS level during ischemia/reperfusion.

Student
Nicole Moore

Major
Biochemistry

Research Mentor
Dr. Marilyn Morris

Title
GHB Metabolism

Abstract
γ-Hydroxybutyric acid (GHB) is an endogenous fatty acid derived through mammalian metabolism and is found in both the central nervous system and peripheral tissues. The metabolism of GHB is largely studied due to its role as a drug of abuse. Oxidation of GHB to succinic acid is the principal metabolic pathway for GHB metabolism. GHB enters the Kreb's cycle following enzymatic oxidation. My study aims to demonstrate the metabolism of GHB in rat tissues, specifically rat liver, where GHB is known to metabolize. This experiment revolves around an incubation time course where we are able to analyze the half-life of GHB in various tissues. By using different enzymes and cofactors we can observe which ones speed up or slow down the metabolism of GHB. Understanding the steps and factors of GHB metabolism will greatly impact further studies of this drug of abuse.

Student
Jessica Page

Major
Biochemistry

Research Mentor
Dr. Gabriela Popescu

Title
Role of Lurcher Motif on NMDA Receptor Gating

Abstract
Glutamate-activated ion channels (iGluRs) mediate ninety percent of synaptic transmission in the brain. They are tetrameric transmembrane proteins and each subunit contains a lurcher motif: a highly conserved 9 amino acid sequence, SYTANLAAF, in the M3 transmembrane helix. In mice, a spontaneously occurring A8T mutation in Delta2 iGluRs results in constitutive receptor activity and causes movements disorders. Many other mutations in this region alter the receptor’s activation mechanism. We investigated the role of the lurcher motif in NMDA receptors, a member of the iGluR family involved with memory, learning and pathologic neurodegeneration. We produced a series of mutant receptors by substituting G, C, T or Y at A7 or A8 of GluN1 or GluN2A, NMDA receptor subunits. We expressed recombinant receptors in HEK293 cells, and recorded cell-attached single-channel currents from wild-type and mutant receptors. For each receptor, we estimated open channel probability and mutant receptors. For each receptor, we estimated open channel probability and mean durations of openings and closures. We determined that positions A7 and A8 have distinct contributions to channel activity, whether they belong to GluN1 or GluN2A subunits. We conclude that the lurcher motif has subunit-dependent effects on NMDA receptor activation. More detailed kinetic analyses revealed the mechanism by which these residues modify channel gating.

Student
Brian Payne

Major
Biomedical Sciences

Research Mentor
Margarita L. Dubocovich, Ph.D.

Title
Consumption of Methamphetamine Decreases in a Two-Bottle Choice Drinking Paradigm in C3H/HeN mice

Abstract
Studies in our laboratory indicate that melatonin increases the magnitude of methamphetamine (METH)-induced locomotor sensitization in C3H-HeN mice. We hypothesize that melatonin can also increase self-administration of METH. To test this hypothesis, we measured the amount of liquid consumed by mice presented two drinking bottles. Half the mice received vehicle (0.1% ethanol v/v) in both bottles (VEH group); the rest (METH group) received bottles filled with vehicle (Bottle 1) or METH (Bottle 2: 0.005% w/v in VEH). The bottles were weighed and refreshed every 3-4 days for calculation of average daily consumption. There was no significant difference in total liquid consumption between the VEH (7.87±0.48 ml/day, n=8) and the METH (7.60±0.33 ml/day, n=8) treated groups. However, consumption from Bottle 2 (0.7±0.21 ml/day) containing METH was significantly decreased when compared with corresponding VEH containing Bottle 2 (2.1±0.10 ml/day; p<0.05). The decreased liquid consumption from Bottle 2 (METH) was of the same magnitude as the increase in VEH consumption from Bottle 2. These results suggest a conditioned aversion to METH. We will corroborate these findings using high-resolution video analysis of drinking behavior. In addition, we will use this experimental paradigm to determine the capacity of melatonin to potentiate the consumption of METH. Supported by DA 021870.

Authors: Brian J. Payne, Shannon J. Clough, Anthony J. Hutchinson, Margarita L. Dubocovich

Student
Sarah Popadowski

Major
Biochemistry

Research Mentor
Mark O'Brian, Ph.D., Tom Hohle

Title
Pyruvate Kinase Gene in Rhizobium Japonicum.

Abstract
Currently, I have just isolated the Pyruvate Kinase Gene from the soy bean plant
Rhizobium Japonicum. I first ordered primers specific to the gene, then used a PCR reaction, and an 8% agarose gel to amplify and purify the DNA segment of interest, using the entire genome as a template for the reaction. I then performed a ligation reaction using my extracted DNA, a 10x buffer, and a T4 ligase. I created a plasmid which I inserted into a colony of 10b RbCl e-coli bacteria cells. Once inserted, the e-coli were incubated overnight, spun down, resuspended, and mini-prepped. The gene was thus over expressed via e-coli. The e-coli were then restreaked on plates containing LB growth media, ampicilin, and chloramphenicol. The gene will be sent for sequencing and then digested. After that, it will be used in several different studies and growth assays. This is part of a bigger study done by my supervisor Tom to characterize the pyruvate kinase gene and determine its function under different iron and manganese conditions.

Student
Tatiana Shaurova

Major
Pharmacology & Toxicology

Research Mentor
Dr. Raj Rajnarayanan

Title
Curcumin analogues for targeting cancer metastasis via G-alpha protein signaling

Abstract
Heterotrimeric G proteins act as molecular switches that modulate numerous cellular signaling pathways. G-protein signaling is initiated and mediated by the binding of guanine nucleotide Exchange Factors (GEFs) to inactive G-proteins which accelerates the rate of exchange of GDP for GTP. Gai proteins have been demonstrated to enhance Akt activation, remodel the actin cytoskeleton, and mediate cell migration, making them a desirable pharmacological target for inhibiting cancer metastasis. A GDP-selective Gai binding peptide, KB-752, has previously been demonstrated to enhance spontaneous nucleotide exchange of Gai subunits. Several specific contacts between a conserved TWXE/DFL and Gai have been shown to be critical for nucleotide exchange. A library of peptidomimetic small molecules utilizing a core structure from the natural product curcumin was constructed. Computer-assisted drug discovery focused the library to identify curcumin analogues that bind Gai1 in a fashion similar to the tryptophanyl moiety of KB-752. The analogues are being synthesized and prepared for analysis.

Student
Bansi Vedia

Major
Biotechnology

Research Mentor
Fraser Sim, Ph.D.

Title
Regulation of human oligodendrocyte differentiation by muscarinic receptor

Abstract
Oligodendrocytes, the myelin producing cells in the nervous system, are destroyed in Multiple Sclerosis. In a genomic study to identify drug targets that may induce myelin repair, we identified the muscarinic cholinergic M3 receptor as highly expressed by human oligodendrocyte progenitor cells. We treated progenitors with oxotremorine, a specific agonist of muscarinic receptors, for 4 days and assessed cell fate and proliferation using immunocytochemistry. Oxotremorine treatment resulted in a dose-dependent decrease in oligodendrocyte differentiation (1-way ANOVA, p<0.01). The proportion of O4+ oligodendrocytes was significantly reduced from 16.0±2.4% at 0μM to 8.3±1.5% at 40μM oxotremorine (n=3, Tukey’s post-hoc p<0.05). The proportions of dividing cells (BrdU) and oligodendrocyte lineage cells (Olig2) were not altered suggesting that the effect of oxotremorine was to directly block oligodendrocyte differentiation. As such, we have identified an operative receptor expressed by human oligodendrocyte progenitors that may be targeted to regulate oligodendrocyte differentiation in demyelinating disease.

School of Nursing

Student
Jenna Goehle

Major
Nursing

Research Mentor
Yu-Ping Chang, Ph.D., RN

Title
Substance Use among Older Adults with Prescription Psychotherapeutic Drug

Abstract
Background: Approximately 22% of the older adult population is currently receiving prescription psychotherapeutic drugs, which have a high abuse potential. Poly-substance use (the use of alcohol, tobacco, or illicit drugs in addition to psychotherapeutic drugs) can be especially detrimental to the one’s health and makes older adults more susceptible to falls, automobile accidents, and death. However, little is known about polysubstance use among older adults.

Purpose: This study aimed to describe the prevalence of poly-substance use in older adults with prescription psychotherapeutic drugs.

Design: This study used a cross-sectional design. Participants were recruited from three primary care clinics and two senior apartments in Buffalo area.

Results: Preliminary findings (n=85) indicated that 50% of participants reported alcohol consumption with 8 participants reporting binge drinking (consumption of 5 standard drinks on the same day in the past month), 46% reported tobacco use and 11% reported marijuana use.

Conclusion: The findings suggest a need for providing educations for older adults who are taking psychotherapeutic drugs.

Student
Kristen Runco

Major
Nursing
Treatments to slow or reverse the injury pending need to develop more beneficial treatments to slow or reverse the injury. Therefore, there’s a pending need to develop more beneficial treatments to slow or reverse the injury caused during the ischemic attack. Rosiglitazone, an anti-diabetic drug, has been associated with increased risk of heart disease according to some data, when taken chronically. Our hypothesis states that when administered acutely, Rosiglitazone (RGZ) could have cardioprotective effects immediately after ischemia. For this purpose, non-diabetic mice were subjected to global ischemia for approximately 20 minutes and the heart was reperfused for 30 minutes immediately after. There was an improvement in recovery between the mice treated with RGZ when compared with the control group. RGZ is thought to perform its actions by activating several cardioprotective signaling cascades, such as AMPK. Western Blotting was performed which compared different levels of activated P-AMPK after ischemia between the control and the group treated with Rosiglitazone. Based on results, Rosiglitazone treatment activated AMPK as the levels of P-AMPK were increased.

Background: Use of Tenofovir (TFV), part of first-line treatment recommended for HIV+ patients, has been associated with renal toxicity via a mechanism largely unknown. The objective was to evaluate the association between ABCC2 -24C>T polymorphism and TFV-related renal damage.

Method: A total of 40 HIV+ patients were selected, treated with TFV-containing regimens. Renal damage was defined as the presence of at least one indicator above normal range, including BUN, [Na+] , [K+] and [creatinine]. The -24C>T on ABCC2 promoter region was detected by real-time PCR with a TaqMan probe. Results: Significantly higher indicator levels were noted in patients with renal damage. Pharmacogenomic analysis is currently ongoing.

Conclusions: Renal damage related to TFV resulted in significantly higher concentrations of BUN, [K+] and [creatinine] that could serve as diagnostic indicators. The potential use of genomic markers for this purpose will be evaluated.

SCHOOL OF PUBLIC HEALTH & HEALTH PROFESSIONS

Student
Rachel Kanouse, Juliianne Stiene, Ashlie Tam, Danyue Zhang

Research Mentor
Harold Burton, Ph.D.

Title
Exercise Intervention in Breast Cancer Patients with Treatment-Induced Arthralgia

Abstract
Aromatase inhibitors (AIs) block estrogen synthesis and are used to treat breast cancer patients. The most common side effect of AI treatment is joint pain. PURPOSE: Examine the effectiveness of an exercise program in reducing joint pain and improving quality of life (QOL) and functional performance in breast cancer patients treated with AIs. METHODS: Subjects participated in an 8-week, home-based program and performed resistance and aerobic exercises. We measured: 1) anthropometry (height, body mass, waist and hip circumference, and body composition; 2) functional performance (grip strength, arm curl to exhaustion, and sit-to-stand) and 3) cardiovascular endurance (step test). Joint pain and QOL were assessed using self-administered surveys. RESULTS: No significant pre-post changes were observed in anthropometric measures. All measures of functional performance significantly improved and subjectively, participants reported an improvement in QOL and some had reduced joint pain.
CONCLUSION: An 8-week, home-based exercise program significantly improved functional performance and QOL in breast cancer patients suffering joint pain.

Student
Philip Mathew

Major
Exercise Science

Research Mentor
Dan K. Ramsey Ph.D.

Title
Degree of Correction on Pain Relief

Abstract
Objective: Examine the degree to which brace correction mediates pain relief, improves knee function and stability. In addition, conclude whether compensatory kinematic and kinetic movement patterns combined with neuromuscular function are diminished.

Method: Sixteen patients with medial knee osteoarthritis (OA) underwent gait analysis under three conditions: knee unsupported, followed by 2 randomized brace conditions (neutral and valgus correction). A two-week washout period separated brace conditions. Self-report questionnaires were completed after each gait assessment. Muscle onset and offset, peak, and joint moments were calculated. Data from 8 age and gender matched controls were compared.

Preliminary Conclusion: Symptoms, pain, function and knee instability scored worst when unsupported and highest when wearing a neutral brace. Knee flexion range of motion (RoM) during weight acceptance was impaired compared to controls in all brace settings, with the greatest improvements occurring in the OA brace.

Title
Effects of caffeine supplementation and time trial protocol on cognitive function and exercise performance

Abstract
Background: Evidence suggests that caffeine can act as an ergogenic aid during endurance exercise. Purpose: 1) To determine if caffeine ingestion can affect cognitive function and exercise performance during prolonged intense cycling and 2) To assess the extent to which measurements of cognitive function are related to endurance exercise performance in various types of trials.

Methods: Thirteen well-trained cyclists will consume a carbohydrate-electrolyte (CHO-e) beverage and a capsule containing 6mg/kg caffeine (CAF) or placebo one hour prior to performing either a 50k time trial (TTD) or exhaustive exercise (TTE). Cognitive function will be measured before, during and after exercise.

Results: We anticipate significant improvements in exercise performance and cognitive function in the TTD-CAF and TTE-CAF trials compared to controls, with the greatest improvements occurring in the TTE-CAF trials.

Conclusion: We expect that the improvements in endurance exercise performance are due, at least in part, to caffeine-induced enhancements in cognitive function.

UB’s Undergraduate Academies are communities of common interests that focus on three broad issues: Civic Engagement, Global Perspectives and Research Exploration. The Academies provide students with a distinctive and comprehensive undergraduate experience.

Global Perspectives Academy
The Global Perspectives Academy is a diverse community of students and faculty committed to exploring international affairs and enhancing campus awareness of the ways in which our global society is truly interdependent. Under the direction of Dr. David Fertig, Academic Director and Associate Professor, Department of Linguistics; students have selected their research topics on a broad range of issues that reflect the globalization of social problems and concerns.

Student
Preksha Arora, Marion Carvalho, Amanda Haskell, Christine Naassana, Sadah Proctor, Emily Pumm

Research Mentor
Dr. David Fertig, Ph.D., Jillian Pugliese, and Robert Townsley

Title
Buffalo: A Modern Day Melting Pot

Abstract
Why do certain ethnic groups choose to migrate to Buffalo over other regions, and what problems do these groups face pre- and post-migration? To address these questions, data will be gathered through interactions with Journey’s End, a refugee service in Buffalo, as well as the International Institute in Buffalo, and finally through our own research. The goals of this project are to gain a greater knowledge of the different cultures that live in the Buffalo area and the motivations that brought them here, and also to raise awareness and inspire our audience to reach out and help refugee groups in Buffalo.

Students
Farhana Bilkis, Erica Buckhanan, Gaia Oliver, Nathan Sauer, Matt Zaslansky

Research Mentor
Dr. David Fertig, Ph.D., Jillian Pugliese, and Robert Townsley

Title
The Nature of the Crisis in Chad

Abstract
Chad is a semi-desert, landlocked country with many internal conflicts. Due to Chad’s geographic location and administrative issues, the nation suffers from poverty, inadequate infrastructure, insufficient health care, violence and incoming refugees. Although Chad has gold, uranium, and oil, it is far from rich due to the state’s corruption. This research
assesses the nature of the Chadian crisis by exploring appropriate and reliable databases, including United Nations databases and other reputable news sources. The purpose of this research is to raise awareness about Chad’s plight because it is an example of a nation in crisis, and considering that Chad has a population of about 10 million people, Chad’s problems are underrepresented by the global media. The situation in Chad deserves some publicity, and the goal of this research is that, through efforts made on this project, more people and organizations will acknowledge and address the crisis in Chad.

**Economic Implications of Hosting the FIFA World Cup**

**Title**

Economic Implications of Hosting the FIFA World Cup

**Abstract**

The FIFA World Cup games have varying economic implications on host nations, often due to situational and exclusive circumstances. In this study, we seek to analyze the financial efficacies of the games on the hosting nations, and determine the conclusive long-term economic effects of hosting the games. We will examine the economic indicators of past host nations preceding and succeeding the games, and will determine a correlation between the presence of the games in the host economy and its influence on the economy subsequent to the games. This determinant will allow us to conclude whether or not hosting the World Cup is beneficial to a nation’s financial system, and will provide us with a general standard of its effect on host economies. We will use this standard as a projectable means to predict the sustainable GDP of Brazil following the 2014 World Cup games.

**An America-Made Epidemic: A Global Look at Skin Bleaching & Colorism**

**Title**

An America-Made Epidemic: A Global Look at Skin Bleaching & Colorism

**Abstract**

Has America’s race ideology and obsession with skin color and shade caused and contributed to a skin bleaching epidemic? What are the dangers of skin bleaching to the human body as well as its physiological effects? Using data and literature from reporting outlets and medical journals, we will assess the documented effects and consequences of bleaching creams. Within different regions and countries of the world, we will look at the influence of popular media, such as magazines, commercials, etc., on the increased usage of skin bleaching creams by people with darker skin tones. The goal of this research is to analyze the role of American media in an epidemic of skin bleaching.

**Rebuilding the body: An insight into the potential of stem cells**

**Title**

Rebuilding the body: An insight into the potential of stem cells

**Abstract**

The goal of our research is to determine if adult stem cells can be applied for organ therapy as effectively as embryonic stem cells. Stem cells have the ability to take on the function of any type of body cell. This aids in replacing and repairing organs that fail from any mechanism. In past research, embryonic stem cells have been proven to perform this function. However, recent research has shown that there is potential in adult stem cells for performing a specialized task with the same efficiency of embryonic stem cells. An alternative to the embryonic stem cell will end the ethical debate that has been surrounding this topic for over six decades. Potential uses will be looked at to confirm the necessity to further develop the ability of the adult stem cell. Conclusions will be made based on the information obtained to ascertain the effectiveness of adult stem cells.

**Regime**

**Title**

The Rise and Fall of Mubarak’s Regime

**Abstract**

What were the key success factors in Egypt’s fight for democracy? What role did the internet (and consequent censorship) play in the organizing of protests over 18 days in early 2011? Given President Hosni Mubarak’s 30-year reign, why only now were the Egyptian people able to force his resignation? Our data include statistics of those individuals killed during the protests, personal accounts of surviving protestors and news reporters who were there through it all, and also propaganda used by President Hosni Mubarak’s government to encourage unrest among the Egyptian people. The goal of this research is to learn while teaching others the true power of the human voice and dedication to a cause. The Egyptian people lived under an oppressive leader for nearly 30 years, and when they came together as one people in uprising, they were able to change their world.

**An America-Made Epidemic: A Global Look at Skin Bleaching & Colorism**

**Title**

An America-Made Epidemic: A Global Look at Skin Bleaching & Colorism

**Abstract**

Has America’s race ideology and obsession with skin color and shade caused and contributed to a skin bleaching epidemic? What are the dangers of skin bleaching to the human body as well as its physiological effects? Using data and literature from reporting outlets and medical journals, we will assess the documented effects and consequences of bleaching creams. Within different regions and countries of the world, we will look at the influence of popular media, such as magazines, commercials, etc., on the increased usage of skin bleaching creams by people with darker skin tones. The goal of this research is to analyze the role of American media in an epidemic of skin bleaching.

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The goal of our research is to determine if adult stem cells can be applied for organ therapy as effectively as embryonic stem cells. Stem cells have the ability to take on the function of any type of body cell. This aids in replacing and repairing organs that fail from any mechanism. In past research, embryonic stem cells have been proven to perform this function. However, recent research has shown that there is potential in adult stem cells for performing a specialized task with the same efficiency of embryonic stem cells. An alternative to the embryonic stem cell will end the ethical debate that has been surrounding this topic for over six decades. Potential uses will be looked at to confirm the necessity to further develop the ability of the adult stem cell. Conclusions will be made based on the information obtained to ascertain the effectiveness of adult stem cells.


**Title**

**Inkjet Organs: An Examination of Computer-Aided Tissue Engineering and Bioprinting**

**Abstract**

Computer-aided tissue engineering (bioprinting) is the process of building up biological tissues layer by layer. In theory, commercial inkjet printers can be modified for the application of bioprinting. However, the technology is still in its infancy. The bladder is one of the most physiologically simple organs to reproduce. Potential problems for the bioprinting of bladders include degradation and decreased efficiency when compared to the original organ. Clinical trials are underway using bioprinted bladders in human patients. We will draw conclusions about the effectiveness of current clinical trials related to bioprinted bladders and examine the possibility of printing more complex tissue, such as liver.

**Students**

Justin LaMarca, Natalie Licata, Rauwolfia Mannan, Lumiere Valentine

**Mentor**

James N. Jensen and Jennifer Trapani

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**Title**

**Reducing Liver Transplantation Rejection Rates with Bone Marrow**

**Abstract**

Recipients of liver transplants are usually treated with immunosuppressant drugs. There is a 10% to 15% chance of organ rejection soon after the transplant and a 58% chance of surviving 15 years. Our hypothesis is that patients who undergo a bone marrow transplant and a liver transplant at the same time will have a lower organ rejection rate. Data analysis from scholarly journals and interviews with professionals will be used to reach a conclusion. Preliminary published research suggests that having a bone marrow transplant simultaneously with a liver transplant will yield lower organ rejection rates. Conclusions will be drawn that bone marrow transplants may be an alternative to current treatments to prevent organ rejection.

**Students**

Kan Hong Zheng, Shirin Vartak, Paul-Andra’e Lewis, Aaron Wray

**Mentor**

James N. Jensen and Jennifer Trapani

---

**Title**

**Artificial Circulatory System: Can It Be Done?**

**Abstract**

Several advancements have been made in the development of organs within the circulatory system, including the heart, blood vessels, and blood. Our hypothesis will consider the possibility of replacing all the organs of the circulatory system (heart, blood vessels, and blood) with artificial organs. To do so, we will use published literary sources from libraries, internet databases, as well as professionals within the field who have knowledge of the topic. The functionality of each circulatory organ will be discussed along with the functions of the substitute system. Discussions will include the advantages and disadvantages of the artificial organ system. We will conclude whether or not it is feasible to replace the entire circulatory organ system with artificial technology and still allow for a person to function at a healthy level.

**Students**

Erica Buckhanan, David Dodge, Destiny Johnson, Samia Mahnoor

**Mentor**

Dr. Barbara Bono, TA Margaret Konkol

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**Title**

**Rebuilding Buffalo's West Side, in Collaboration with The West Side Community Collaborative**

**Abstract**

Buffalo’s West Side, historic, beautiful, and traditionally a first home for many immigrants, has fallen into economic and social disarray. Problems with ownership and establishing a strong sense of community have led to crime and decreased property values. However, there are currently many signs of renewal in this stressed neighborhood. The West Side Community Collaborative, driven by community activist Harvey Garrett, is a major force that works to empower citizens to become a community bonded together by shared interests, block-style planning, and the motivation to make the West Side a better place. We will be going door to door in the neighborhood affected by the Peace Bridge diesel fumes surveying health concerns and educating people about what they can do to change this desperate situation.

**Students**

Samantha Black, Malcom Bracy, Emily Byllott, David Dodge, Harsh Bipin Kumar

**Mentor**

Dr. Barbara Bono, TA Margaret Konkol

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**Title**

**Turning Up the Heat, in Collaboration with PUSH Buffalo**

**Abstract**

PUSH Buffalo (People United for Sustainable Housing, http://pushbuffalo.org) is a grassroots organization centered in Buffalo’s West Side that is devoted to making affordable housing a reality in Western New York. Our volunteer group is focused specifically on PUSH’s current efforts to help lower-income Buffalonians keep their houses warm in our cold winters: 1) weatherizing older homes through supplying materials, know-how and labor; 2) lobbying National Fuel Company to enhance its customer-funded fuel conservation program. Our group’s focal point is on collaborating with PUSH Buffalo in order to raise awareness about National
Fuel's noncompliance with its own directive in addition to helping residents of the West Side of Buffalo weatherize their homes. This project includes visitation to the neighborhood, meetings to PUSH to strategize their mobilization, and advocacy throughout Buffalo about National Fuel's unfair standards.

Students
Nathan Catlin, James Catlin, John Dahunsi, Jeffrey Morgan, Dan Maitles

Mentor
Dr. Barbara Bono, TA Margaret Konkol

Title
Growing Back from Arborgeddon, in Collaboration with Re-Tree Western New York

Abstract
Trees grace Buffalo’s cityscape, especially along its boulevards and parkways designed by the landscape architect Frederick Law Olmsted. On October 12-13, 2006 a surprisingly early blizzard dropped two-and-a-half feet of heavy wet snow on the city and its nearby suburbs. Over 90% of the trees in the city were killed or severely damaged. Re-Tree Western New York (http://www.re-treewny.org) is a grassroots organization established within a month by a group of about 40 dedicated Western New York residents who wanted to restore the damage. They embarked upon a multi-year project to replace the approximately 30,000 trees that were affected. In collaboration with Re-Tree Western New York our group will volunteer in a significant tree-planting project to recognize Earth Day on Saturday, April 23, 2011. We intend to engage both middle and high school age students in establishing environmental conscious in Buffalo’s youth.

Students
Krista Coleman, Kelsey Russo, Elizabeth Teebagy, Jessica Traub

Mentor
Dr. Barbara Bono, TA Margaret Konkol

Title
Love is a Choice

Abstract
Intimate Partner Violence or IPV (physical, sexual, or psychological harm by a current or former partner or spouse) is an overlooked problem on the UB Campus. One in four women will experience IPV and women ages 20-24 are at greatest risk. However, people of all demographics can be abused or be abusers. Our project contains three components. First, we will raise awareness of IPV by creating posters or other materials that describe and warn about IPV situations and the resources to address them. These will be placed in areas such as in bathrooms and RA boards. Second, we want to make it a requirement that students are addressed about the dangers of IPV through a short presentation at all New Student Orientations. Finally, through several organizations, we will spearhead a mentor program that will provide victims of IPV with a trained and objective ally to advise them throughout their recovery process.
Student presenters were nominated by their Deans to participate in today’s Celebration of Academic Excellence. Each decanal area was asked to go through their own selection process and supply a limited number of undergraduate student works. In limiting the number of student presentations from the various undergraduate schools, a wide variety of scholarly and creative works was able to be showcased. During this poster session we celebrate UB’s undergraduate students and their faculty mentors who are engaged in innovative work and scholarly research. The nominated student works you are viewing are stellar examples of the undergraduate research opportunities available to UB students. Thank you for joining us today as we “Celebrate Excellence” in undergraduate research and creative works.