



E I G H T H A N N U A L

Celebration of
Student
Academic
Excellence

THURSDAY, APRIL 5, 2012

Center for the Arts



2012

INSTITUTE FOR RESEARCH & EDUCATION ON WOMEN & GENDER

Students

Rachel Todd, Editor-in-Chief
Rachelle Toarmino, Arts Editor
Erin Maynard, Book Review Editor
Caleb Houseknecht, Editorial Board
Gabriel Kahn, Editorial Board
Venice Lau, Editorial Board
Mike Hurst, Managing Editor

Research Mentors

Dr. Kari Winter, Dr. Barbara Bono

Abstract

Speakeasy: An Undergraduate Journal of Research and Creative Art is sponsored by UB's Institute for Research and Education on Women and Gender (IREWG, or The Gender Institute). Speakeasy promotes scholarly and creative work on gender, feminism, and sexuality, and seeks innovative essays, fiction, poetry, and visual artwork that take these themes as their central concern. Examples of topics include the history of sexuality, women's health issues, abortion, gender and the environment, gender and economics, violence against women, constructions of masculinity and femininity, the gay rights movement and gay marriage, the body, representations of gender and sexuality in art and literature, and the intersection of gender with other identity vectors such as race or class. To read previous issues, please visit our website at <http://genderin.buffalo.edu>.

SCHOOL OF ARCHITECTURE & PLANNING

Student

Samantha Axberg

Major

Environmental Design

Research Mentor

Eric Poniatowski, M.U.P.

Title

Saint Joseph's Cathedral: A Monument to Buffalo's Blue-Collar Past

Abstract

Saint Joseph's Cathedral, located at 50 Franklin Street, is an important historic landmark in Buffalo. Saint Joseph the Worker stands as patron saint to the city's proud, blue-collar past. The Irish immigrants who worked hard to earn their new lives found peace, inspiration, and guidance within the church. Today, we celebrate the church and its position, both historically and presently, within the downtown Buffalo and Western New York Region.

Students

Robert L. Barnette III, Tiffany Chen, Tomasz Majkut

Major

Architecture

Research Mentor

Professor Hiro Hata, Professor Harry Warren

Title

Machine Embedded in the Garden

Abstract

Our project involves the design of a bridge which links the Inner and Outer Harbor of Buffalo at the foot of Main, resulting in a Urban Design Master Plan of the connected areas served by the bridge. By working in teams of architects and urban planners, we study key aspects of site that contribute to our design of the bridge, which acts as a link or transition from the Inner Harbor to Outer Harbor of Buffalo, New York. Precedent studies help us learn about other urban planning projects of similar circumstances. We are assisted by the involvement and aid of Erie County Harbor Development Corporation in our process or designing our site and bridge. In conclusion, "Machine Embedded in the Garden" defines the concept of the Master Plan for the Inner and Outer Harbor of Buffalo, and the connecting new bridge.

Student

William Becker

Major

Environmental Design

Research Mentor

Dr. Samina Raja

Title

Perceptions of Hydraulic Fracturing

Abstract

Hydraulic fracturing is an environmental issue that has potential impacts for the economy, the planning of communities, and public health. This research discusses the various impacts of hydraulic fracturing, frames it in the context of environmental education, and seeks to understand the college student perception of the issue. An analysis of existing literature on related environmental topics places hydraulic fracturing in the context of environmental education. A survey was distributed to undergraduates in the SUNY system to gauge the student perception of hydraulic fracturing. Engaging the student population with this issue is important because students are future leaders that will have to make important decisions regarding the environment.

Student

Nicole Lynn Halstead

Major

Architecture

Research Mentor

Laura Garofalo, M.Arch.

Title

Wetscape Generator

Abstract

This Project is being design for submission to the 2012 Land Art Generator Initiative Competition. The Intent of the project is to develop a land sculpture on the Fresh Kills Landfill site that generators energy. The Fresh Kills Landfill site sits on what originally was a large tidal wetland area. Wetlands offer unique wildlife and plants



2012

to areas. The past developments in areas like Fresh Kills Landfill have restricted such sites resources. Therefore, this project aims to reclaim the Site of Fresh Kills Landfill as a wetland by using wind turbines to pump water up and discharging it down the Landfill mounds. This will offer the ability to utilize a more consistent generator source, hydropower, through the constant flowing of water. Wetlands offer the potential for wastewater treatment; this site which is a container for waste can now help remove containments from water. Through natural resources, like wind and water, the site has the potential to recycle water and increase energy production in a harmonious way.

Student
Nahshon N. Jagroop

Major
Environmental Design

Research Mentor
Eric Poniatowski, M.U.P.

Title
Erie Canal Harbor at Canalside

Abstract
The Erie Canal Harbor at Canalside is a picturesque sight located in Buffalo's Inner Harbor. It's a unique place that's filled with rich history and diversity. It's easily identifiable by its military naval vessel.

Among one of the greatest innovations conceived in the 19th century and early 20th century, the harbor functioned as a bustling "western terminus" of the Erie Canal. In Buffalo, both the Commercial Slip and the Erie Canal were opened on the 26th of October, 1825. The Erie Canal was the lifeline of Buffalo that eventually led to it becoming one of America's largest cities during the 1900-50s. Buffalo's emergence as the Queen City of the Lakes was made possible by the convergence of Lake Erie and the canals, which allowed prosperous trade.

Student
Alexandra Lima

Major
Architecture

Research Mentor
Ed Steinfeld, Arch.D.

Title
Interactive Multisensory Model

Abstract
Develop a prototype for an Interactive Multisensory Model using the University at Buffalo as the location. The project will include a set of research tasks that would provide information leading to the development of the next generation model and a universal design application.

Student
Adam Palkowski

Major
Environmental Design

Research Mentor
Daniel B. Hess, Ph.D.

Title
Multi-modal Streetscape Assessment

Abstract
While selecting a streetscape in the Buffalo metropolitan area, an evaluation will be made of the elements of the street right-of-way in terms of their effects on transit use, pedestrian access, and vehicle use, and potential conflicts between modes of travel. Adjacent land use patterns and building setbacks and configurations and presence of surface parking will be included in the evaluation. Difficulties of the various travel modes and users of the corridor will be assessed. Aerial images, maps, images of the streetscape, and a written analysis, conclusion, and recommendation will be included.

Student
Alyssa Phelps

Major
Architecture

Research Mentor
Christopher Romano, M.Arch.

Title
Construction and Computation

Abstract
This technical methods seminar for the Ecological Practices Research Group will examine the multiple scales of waste in the Architecture, Engineering and Construction (AEC) industry and address the problem through more efficient ways of manufacturing and assembling buildings with advanced fabrication tools. We are all aware of the alarming statistics: 40% of all waste in the United States is construction debris. This course will address how the life cycle of materials – from their origins, through their manufacturing, use and eventual disposal can be better managed through design and advance manufacturing tools. The course intends to examine these issues through prototyping and interrogating the process of making / building. Students should expect to become proficient with various manufacturing techniques, both digital and manual, as they develop research projects related to the content of the course. The Shop and DMG Lab will serve as our laboratory and students will be introduced to digital fabrication tools such as the CNC Plasma Cutter and CNC Router There will be three projects, each progressively increasing in scale and culminating with a prototype for a full-scale wall system.

Student
Michael Puma

Major
Environmental Design

Research Mentor
Gregory Delaney, M.Arch.



2012

Title

Reading Buffalo Through Blueprints

Abstract

The blueprints of a building are crucial to fully understanding and reading its architecture. They offer every detail of construction, ornamentation, and layout. While many historic buildings in Buffalo have been destroyed, there is still an amazing collection, which still remains. The blueprints for buildings like the Buffalo Central Terminal, Shea's Buffalo, or the Market Arcade offer a glimpse into the golden age of the City. Sometimes these blueprints reveal secrets which have long been covered up or gone missing. They are truly the guide to interpreting the history of buildings in Buffalo.

Student

Matthew Wattles

Major

Environmental Design

Research Mentor

Daniel B. Hess Ph.D.

Title

Baikal International Winter University of Planning and Design

Abstract

For 13 years Irkutsk State Technical University in the city of Irkutsk, Russia has been collaborating with local government and international partners to form a planning workshop meant to improve the city. Winter University invites students from all over the world to propose the best projects to be implemented within Irkutsk. It is an intense, 3-week experience culminating with a presentation to the architecture and design department of the university, the Irkutsk city administration, local investors and international professors.

The greater goal of the workshop is to inspire creativity in urban planning through collaboration with peers and experts from different countries who have different specializations. Students who study architecture, urban design,

urban economics, geography, sociology, landscape architecture and engineering all work together to enrich their conceptual and analytic knowledge through working together. Each year a different theme is chosen, which reflects the dynamically developing urban planning systems in Siberian cities. This year the theme was "Suburbanization and city ecology." The workshop gave students empty areas within the city to plan and design in an ecological manner.

My independent study this semester consisted of participating in the Winter University. It was an experience of a lifetime and taught me things I could not learn through traditional education. My trip there was also meant to establish a connection with the program in hopes that many more UB students will participate in years to come.

COLLEGE OF ARTS & SCIENCES

Students

Vivaswath Ayyar, Rahat Whig

Major

Biological Sciences and Psychology

Research Mentor

Dr. Malcolm Slaughter

Title

Effect of drug Memantine in blocking activity of open channel N-methyl-D-aspartate (NMDA) glutamate receptors.

Abstract

L-Glutamate is the major excitatory neurotransmitter in the central nervous system. An abundance of glutamate receptors are found on neuronal cells, especially in the brain. There are three types of ligand-gated (ionotropic) glutamate receptors, namely NMDA (N-methyl-D-aspartate), AMPA (α -amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid) and Kainate receptors, collectively called GluRs, while there is also a type of G-Protein coupled (metabotropic) receptor. The ionotropic receptors activate a cation-selective ion channel permeable

to key ions like Na⁺ and K⁺, the NMDA receptors also being permeable to Ca²⁺ but blocked by Mg²⁺. GluRs have been associated with playing a role in synaptic plasticity and various types of memory including long and short-term memory, spatial and episodic memory due to the influx of these ions. Ca²⁺ influx through the NMDA receptor during depolarization is especially important because it is a second messenger molecule. However, excessive activation of NMDA receptors is thought to mediate calcium-dependent neurotoxicity associated with trauma, epilepsy, and neurodegenerative diseases like Parkinson's and Alzheimer's. Various NMDA antagonists have been investigated for therapeutic potential in these diseases, but heretofore none have proven to be both effective and safe. However, the drug memantine, which blocks the channels activated by NMDA stimulation, is deemed both effective and clinically tolerated.

Students

Boris Brimkov  **Jim Kotary, Xinwei Liu, Jing Zheng**

Major

Mathematics

Research Mentor

Dr. Jae-Hun Jung

Title

A novel hybrid and interpolation method for rapid CFD for vascular flows

Abstract

Vascular disease is the primary cause of death in the US. Current assessment techniques yield data with low accuracy and much uncertainty. Detailed 3D computational fluid dynamics (CFD) will highly improve the quality of the vascular assessment, but it typically takes too long to be done in a clinical time frame. The goal of our research is to develop a spectral and radial basis function (RBF) hybrid method and the library interpolation method based on the previous work [1] that yields an extremely fast CFD. The hybrid method



is based on the high-order spectral method – which needs a strict grid restriction and is therefore used to model the smooth areas of a blood vessel – and the RBF method, which does not require a strict grid and is used to model the irregular parts of a blood vessel. Hence, we adopt a complex geometry while maintaining high-order accuracy. Using the hybrid method, we create a RBF 3D CFD data set with a variety of parameters and use an interpolating algorithm [1] to obtain the flow fields of an unknown solution, which yields a fast CFD and can be available for clinical timeframe.

[1] J.-H. Jung, J. Lee, K. R. Hoffmann, T. Dorzio, B. E. Pitman, *A rapid vascular CFD through interpolation with spectral collocation methods*, *Journal of Computational Science*, under review, 2012.

Student

Lauren Campise \mathcal{E}

Major

Psychology

Research Mentor

Dr. Mark Seery

Title

Regulatory Fit: Physiological State of Challenge or Threat

Abstract

Regulatory Focus theory describes two domains that underlie motivation: promotion and prevention. Promotion concerns goals and accomplishments whereas prevention concerns responsibilities and obligations. A regulatory focus can be primed momentarily through the directions of a task. When one prime is the same as a second prime a person will experience regulatory fit. Likewise, when one prime is not the same as the second a person will be unfit. This study assessed psychological states that occurred during a fit or unfit situation. Cardiovascular responses were used to distinguish between a relatively positive (challenge) and relatively negative (threat) motivational state that occurred during tasks, by using the biopsychosocial model of challenge/

threat. It was predicted that participants in the fit condition would exhibit relative challenge, whereas those in an unfit condition would exhibit relative threat. The results could potentially help us to better understand the underlying physiological and psychological reactions to regulatory fit.

Student

Shuan-Han Chen, Jeffrey Marvin

Research Mentor

Dr. Kenneth Takeuchi

Title

Microwave technology: An effective approach to rapid material synthesis

Abstract

Microwave technology is useful in materials science, especially in aqueous reactions. During these reactions, water can be heated above its boiling point while the temperature-pressure relationship of the super heated solution is monitored. It has been demonstrated through water tests that the instrument temperature-pressure data agrees closely with theoretical results to confirm the accuracy of this method. One project currently being undertaken with this technology is the synthesis of $MgFe_2O_4$, which takes advantage of the microwaves' capabilities for accessing temperatures and pressures not normally attainable for aqueous reactions. The results of several synthetic strategies will be discussed.

Student

Olivia Crosby

Major

BFA Theater Design and Technology

Research Mentor

Dyan Burlingame

Title

Costume Design Web Portfolio

Abstract

For theater artists it is a challenge to adapt your portfolio to certain circumstances.

In many cases people who are in need of viewing your work are not in close proximity to you and you need to find a way for them to view your work without compromising your physical portfolio. That is the challenge I have faced this year in particular in applying to jobs and Grad school. I went in search of researching websites for portfolios and that is what my CURCA grant helped me do. I attended the Kennedy Center of American College Theater Festival in Indiana, Pennsylvania where there was a workshop on how to create an online portfolio. It provided information on what to leave out of a website as well as what is crucial to your website to best present your work. I will be presenting my current online portfolio and why I chose my layout and the information I have chosen to share.

Student

Alexandra Curtis \mathcal{H}

Major

Biological Sciences

Research Mentor

Katharina Dittmar de la Cruz, Ph.D.

Title

Losing and gaining endosymbionts: A complex evolutionary history of bloodfeeding parasites and their bat-hosts

Abstract

Bacterial associates are known to be ubiquitous in blood feeding parasites such as cosmopolitan ectoparasitic bat flies (Hippoboscoidea, Diptera). However, given the diversity of bat flies, current microbial symbiont records are anecdotal. This hinders our understanding of the role these bacteria play in the evolution of their invertebrate hosts. This study relies on bacterial and fly DNA extracted from diverse bat fly species across the Philippine Islands to determine the genetic diversity of symbiotic relationships of microbes and bat parasites. We have reconstructed the evolutionary history of bacterial symbionts and their invertebrate hosts (flies) and inferred the



2012

historical events that explain the current distribution of flies on their respective bat hosts. Phylogenetic and co-evolutionary analyses suggest that most closely related parasites share closely related symbionts, suggesting ancient lineage specific associations at the onset of parasite radiations. This picture is complicated by occasional symbiont host switches between unrelated parasite taxa. Based on these data, we infer a role for bat migrations across the Philippines in these switches, and suggest that symbiont evolution can potentially inform both the evolutionary history of parasites as well as that of their vertebrate hosts.

Student

Xiaonuan (Kim) Dai

Major

Architecture, Theatre Technology

Research Mentor

Dyan Burlingame

Title

Live Design Portfolio Development

Abstract

A traditional artistic portfolio presents two-dimensional artwork in a condensed two-dimensional format. As theatrical designers, working in a three-dimensional presentational medium, how can our “live medium” design be presented in a “non-live” two-dimensional portfolio? How can we advance the methods by which we document “live design”? Is it possible to capture luminescence, motion, or space in a two-dimensional layout? Research would result in the development of a web portfolio that highlights theatrical skills by these new methods and how they can be applied to various live design industries. Feedback and critique by a professional designer, followed by revision of portfolio is essential to process. Expansion of documentation and archival skills.

Student

Almedina Djesevic 

Major

Pharmaceutical Sciences

Research Mentor

Dr. Steven T. Diver

Title

Ruthenium Catalysts

Abstract

A major problem in organic synthesis is the separation of isomeric mixtures. In ene-yne metathesis, it is common to obtain E/Z mixtures of products. The purpose of this project is to start with an E/Z mixture of a conjugated diene and have the Z isomer convert fully to the E isomer. This would allow chemists using metathesis to obtain a single isomeric product, avoiding tedious separation and loss of their final product. An isomeric mixture of a 1,3-diene was converted to the single E-isomer using Grubbs second generation catalyst in the presence of isopropanol and trace sodium hydroxide. Reactions were heated at 45 °C in toluene for 24 hours.

Student

Zachary Fine

Major

Chemistry

Research Mentor

Dr. Troy D. Wood

Title

High-resolution Liquid Chromatography-Mass Spectrometry to Identify Urinary Biomarkers of Autism

Abstract

Autism is a developmental disorder that affects one in 110 children in the United States, and its incidence has increased dramatically over the last several decades. Children with autism go through rigorous psychological testing when being diagnosed; however, no clinical biomarker has yet been established

for autism. Novel approaches to assist in autism diagnosis based on clinical criteria are highly sought in the pediatrics community. For identification of clinical biomarkers, obtaining clinical samples in a non-invasive way is most desirable. As such, our research efforts have focused on utilizing urine specimens to establish whether there are any statistically significant molecular differences between autism and control populations using liquid chromatography-mass spectrometry (LC/MS) on high resolution mass spectrometers. One of the most promising urinary biomarkers of autism is stercobilin, a tetrapyrrole metabolite of bilirubin. Its (M+H)⁺ is detected at 595.3474 amu at a retention time of 12.6 minutes; SIEVE analysis indicates this species is over 500x more abundant in urines of controls vs. children with autism, making it an extremely promising biomarker.

Student

Emily Fiore  

Major

Biology

Research Mentor

Hadar Borden

Title

Medical Mission: Philippines

Abstract

This winter break I ventured to Tacloban City, Philippines. I worked alongside other dedicated members of Volunteer for the Visayans to provide free medical care at the Santa Fe Rural Health Unit in the morning, and then to impoverished villages ravaged by disease, and childhood starvation in the afternoon. These villages were located roughly four-five minutes away by ambulance, and their accessibility depended on the flooding of the roads. Once we arrived, women and their children gathered around us with their water-damaged paperwork and we injected their children with immunizations. We also gave prenatal multi-vitamins to pregnant women, which we handed to them in discarded syringe wrappers. The



2012

doctor examined each person in need of medical attention, and we provided the medications appropriate for the diagnosis. I was also actively involved in nutrition counseling, and health education programs aimed at teaching preventative medicine in manners relevant to the locals. In addition, I delivered a baby girl at 9:37am on January 5th who weighed 3.28kg, a baby boy on January 11th at 2:15 who weighed 2.22kg, and another baby girl at 2:30am January 13th who weighed 2.95kg.

Student
Megan H. Fitzgerald

Major
Psychology

Research Mentor
Jennifer Read, Ph.D. Associate Professor of Psychology

Title
Residential Status and Drinking Habits of College Students

Abstract
Drinking habits of college students and their residential status will be recorded through self-report measures and an interview. College students that have a residential status of on-campus with supervision are predicted to have fewer drinking episodes per week and consume high amounts of alcohol per episode. College students that have a residential status of off or on campus without supervision are predicted to have more drinking episodes per week and consume moderate amounts of alcohol per episode. College students that have a residential status of off-campus with supervision are predicted to have fewer drinking episodes per week and consume low amounts of alcohol per episode. Findings are predicted to suggest that college students with a residential status on campus with supervision are at a higher risk for heavy alcohol use or binge drinking than college students with a residential status on or off campus without supervision or off campus with supervision.

Student
Yu Gao

Major
BS psychology; BA cognitive science

Research Mentor
Dr. J David Smith

Title
Concurrent task interference in rule-based category learning

Abstract
Ashby and Maddox (2005) propose that humans have multiple systems for learning different category structures. The explicit system is used when the category structure favors learning a uni-dimensional rule (RB task), and the implicit system is required when integrating information from multi-dimensions (II task). The explicit system is proposed to be conscious and require attentional resources. The implicit system is thought to learn more slowly but require fewer attentional resources. Waldron and Ashby (2001) provided the evidence for this in an experiment examining concurrent task interference. A simultaneous Stroop task significantly disrupted RB but not II category learning. The present study is a modified replication of Waldron and Ashby's experiment, using simpler attention grabbing visual stimuli that should be able to engage non-human animals. Participants were asked to learn either an RB or II categorization task either while doing a demanding working memory task or not. Both categorization tasks used a bright yellow/magenta color bar varying in color ratio and size. Initial results suggest that we have replicated the Waldron and Ashby (2001) findings. Next, we will extend the experiment to non-human primates and investigate whether they seem to have multiple learning system like us.

Student
Emily Gargiulo *H*

Major
Pharmacology & Toxicology

Research Mentor
Professor Joshua Dyck, Ph.D

Title
Sex Matters: The Information Disconnect That Plagues America's Youth

Abstract
My research examines the expansion and subsequent reduction in federal funding of abstinence-only sex education since the 1996 creation of the Title V. As states have continually had sharp disparities in teen birth rates, despite a declining national average, I take a closer look at the legislation driving these differences. I develop a scoring mechanism for determining the strength of sex education in the states. More comprehensive legislation is shown to reduce the number of teen births, when controlling for socioeconomic factors. With such evidence I recommend that the federal government continues to research and fund comprehensive sex education to be applied at the state level.

Student
Dara Gildner

Major
Bachelor of Fine Arts - Print Media

Research Mentor
Jeffery Sherven, MFA Print Media Instructor

Title
Speech Reading Levels of Difficulty

Abstract
Many people cannot perceive the necessity of speech reading, also known as lip-reading, for the deaf and hard of hearing. When awareness of the reality sinks in it is often misunderstood as a handicap requiring special or exaggerated behavioral consideration. For those who use speech reading on a regular basis it is accepted condition, an accommodation or adaptation of behavior that provides a clear indication of the factors that impact successful modes of communication. This poster will give a creative overview



2012

of these factors that define the parameters of successful speech reading for those who rely on it for daily interaction. Its primary sources are British and Scottish research articles on speech reading and my own personal experiences in speech reading. I am a late deafened adult who has experienced both normal hearing and its absence, which encouraging me to learn speech reading.

Student
Emily Gibson *H*

Major
Economics and Communication

Research Mentor
Dr. Alex Anas

Title
Would Buffalo improve its economy through decreasing its sprawl?

Abstract
My research is about whether Buffalo's sprawl helps its economy or hurts it, and which measures can be taken to either increase or decrease Buffalo's sprawl. In figuring out the answers to these questions, I also define urban sprawl, state how it can be measured, and the causes of it.

Students
Daniel Gruskin, Richard Klingensmith, Maria Taczak

Major
Communication Design

Research Mentor
Stephanie Rothenberg

Title
Copy, Cut & Paste at SUNY Buffalo

Abstract
The poster documents the student version of an international design competition that was recently held in the Communication Design program at UB. During the competition, UB design students race against the clock to create

a design composition based on a specific theme and are given images and copy they must use in their design. Students have 15 minutes to complete the design. Each student's computer station is projected on a large screen for the audience to watch. The student with the winning design composition moves to the next round. Designs are critiqued on concept, craft and effective communication. This year's themes focused on popular issues such as student debt, Internet regulation and online dating. The event is intended to make visible what happens behind the scenes in creating effective visual communication. A strong concept in conjunction with the techniques of copy, cut and paste are critical to the design process.

Student
Yingri Guan

Major
Studio Art

Research Mentor
Renee Ruffino

Title
The Importance of the Researcher/ Designer Dynamic

Abstract
The goal of our research is two-fold:
1. Educate researchers on how to present their data/research findings through effective poster design utilizing trained graphic/information designers.
2. By example and through collaboration with a researcher, we will use actual data to show effective poster design using basic design theories, principles and typography.
Through this process we will give meaning and understanding to abstract data and transform this data into a clear and concise structured visual presentation.
In addition, we will gain a full understanding on how to present information to the public and the importance of collaboration between a researcher and a designer. As

designers, we play an important role in deconstructing and reconstructing information and disseminating it through good design. Moreover, designers are underutilized in this area of research-based activity and this is one way to begin to inform the public about this very specialized field.

Students *E*
Michael A. Healy and Dana R. Peters

Research Mentor
Dr. Alexis C. Thompson

Title
Anxiety-like Behavior During Abstinence From Cocaine Exposure In Rats

Abstract
Some research laboratories have shown that rats exhibit the greatest amount of anxiety-like behaviors during the first few days of cocaine abstinence (e.g., Harris & Aston-Jones, 1993; Aujla et al., 2008). This is important because humans report anxiety during short periods of abstinence from cocaine, which may increase the vulnerability to relapse (Gawin & Kleber, 1986). We tested a hypothesis through a systematic replication of the findings in rats that cocaine history and days since last cocaine exposure interact to produce an increase in defensive burying responses to an anxiogenic stimulus (1mA shock). In doing so, the generalizability of this result to our laboratory and cocaine model was tested.
No effect of cocaine history was found in the preliminary study conducted in our laboratory, suggesting that there are no differences in anxiety after cocaine exposure. A follow-up secondary analysis was necessary to test differences in previously unquantified behaviors (i.e. rearing and escape-like behavior) among cocaine and saline treated rats. Being unable to support or refute the primary hypothesis has suggested our laboratory's experimenter-administered cocaine rodent model maybe most efficacious at studying motivation (i.e, craving) rather than changes in affect (e.g., anxiety).

H = Member of Honors College

E = CURCA Funded Project



2012

Students

Delnessaw Hirpa, Christina (Kan Hong) Zheng

Research Mentor

Shermali Gunawardena, Ph.D.

Title

Characterizing Parkinson's disease (PD) Proteins in Axonal Transport

Abstract

Parkinson's disease (PD) is a common neurodegenerative disease, which is characterized by loss of dopaminergic (DA) neurons in the substantia nigra par compacta region of the brain, and the presence of dense protein aggregates (Lewy bodies). So far more than eight genes with functions in different pathways have been identified to be associated with PD. However, how these pathways cause pathology associated with PD is unclear. Using *Drosophila* models of PD. Here, we test the hypothesis that all PD genes have a common role in axonal transport. In our crawling assay, neuronal expression of human α -synuclein (α -synWT) and FPD mutations of α -syn show larval locomotive defects compared to mutations of motor proteins. We also found that expression of α -synWT induces axonal defects in larval segmental nerves. Familial Parkinson's disease (FPD) mutations in α -syn also show axonal blockages. Strikingly, α -synWT and FPD mutant α -syn genetically interact with kinesin-1, but not dynein motors. FPD mutant α -syn appears to be in cell bodies in larval brains compared to α -synWT suggesting that mutant α -syn is mislocalized. In contrast, neuronal expression of PINK, PARKIN, DJ1a and LRRK do not induce axonal defects. However, neuronal expression of PINK, PARKIN and LRRK genes with reduction of kinesin-1 shows transport defects. Strikingly, transport problems are only seen with expression of DJ1 with reduction of dynein. Together our observations indicate that PD genes may have a common role in axonal transport.

Student

Gary Iacobucci

Major

Biological Sciences

Research Mentor

Dr. Shermali Gunawardena

Title

Spatial and temporal analysis of axonal transport in primary neuronal cultures from *Drosophila* Larvae

Abstract

Efficient intracellular transport is essential for healthy cellular function and structural integrity. Problems in this pathway have recently been implicated in neuronal cell death and disease. To spatially and temporally determine how transport defects are initiated, we have developed a primary neuronal cell culture system from *Drosophila* larvae to visualize, live, the movement dynamics of several cargos/organelles. In day 1 and day 2 old cultures we observe robust bi-directional movement of six cargos/organelles. Using a MATLAB based single-particle tracker program we have analyzed the movement behavior of these cargos/organelles at each time point. In contrast to WT larval brain cultures, neurons from motor protein mutant larvae show reduced movement of cargos with increased numbers of stalled blocks. Over time, these mutant cultures also show defects in neuronal growth. Strikingly, we find that axonal blockages are not fixed, permanent blocks that impede transport as previously thought, but are instead dynamic. Under some mutant conditions blocks resolve while under other conditions they do not. Taken together, our results propose that non-resolving blocks may initiate deleterious pathways leading to death and degeneration while resolving blocks are benign.

Student

Ute Inselmann

Major

German, French, Spanish

Research Mentor

Erin Kearney, Ph.D.

Title

Second Language Acquisition and Social Identity of Immigrants

Abstract

My research looks at the process of English acquisition and acculturation of immigrants in the city of Buffalo. As part of my research I have tutored a new immigrant from Nepal over the course of 12 weeks and have interviewed immigrants who have been in the States for different periods of time. My analysis considers the theoretical frameworks of Schumann and Krashen with regards to the rapport between acculturation and second language acquisition, but leans on the theoretical framework established by Peirce who has researched the effects of social identity in second language acquisition. My research shows the correlation between the perception of the learner's own social identity and their level of L2 proficiency on the one hand and their degree of acculturation on the other hand. Furthermore, my goal is to show that first generation immigrants can in fact assimilate well to the new culture and adopt a new social identity that fits into this new context, while maintaining their original social identity in areas where the former context continues to exist.

Student

Alesia King

Major

Anthropology

Research Mentor

Dr. Ezra B. Zubrow

Title

Climate Change in Northern Finland

Abstract

Finland was covered by a glacier in the Ice Age, since then the glaciers have disappeared. The repercussions from glacial occupation are still occurring. Land that has been compressed by the



2012

glaciers has been rising slowly since their withdrawal. This change in geography is rapidly occurring today, and it was occurring 6,000 years ago. People who once made their homes by the shore, generations later would have to move miles to be by their main food supply once again. These changes in climate prompted generational changes, which were also influenced by technological advances. Findings on the archaeological site in Finland support this fact, and may be associated with people living in areas affected by glacial rebound on also the continent of Asia and North America.

Student

Sarah E. Kost

Major

BFA Theatre Design and Technology

Research Mentor

Dyan Burlingame

Title

Live Design Portfolio Development

Abstract

A traditional artistic portfolio presents two-dimensional artwork in a condensed two-dimensional format. As theatrical designers, working in a three-dimensional presentational medium, how can our “live medium” design be presented in a “non-live” two-dimensional portfolio? How can we advance the methods by which we document “live design”? Is it possible to capture luminescence, motion, or space in a two-dimensional layout? Research would result in the development of a web portfolio that highlights theatrical skills by these new methods and how they can be applied to various live design industries. Feedback and critique by a professional designer, followed by revision of portfolio is essential to process. Expansion of documentation and archival skills.

Students

Anne Marie Leahey, Cynthia Wills

Major

Communication Design

Research Mentor

Stephanie Rothenberg

Title

Positively Connected

Abstract

This poster is documentation of a Communication Design research project called “Positively Connected”—an advertising campaign to promote tourism in Buffalo through the development and branding of a future public transportation system. The campaign would encourage visitors to Buffalo to use public transportation to explore the city beyond the major landmarks and get a more in depth view of the local flavor of the city. The campaign includes the design of an efficient identity and information system that would be realized through a mobile application and printed maps and public relations marketing through billboards and posters at strategic public locations.

Student

Jennifer J. Leib

Major

Psychology

Research Mentor

Dr. David Smith

Title

Cross Modal Categorization

Abstract

In recent categorization studies, a distinction has been drawn between Rule-Based (RB) and Information-Integration (II) category learning systems. The RB system is specialized for quickly classifying stimuli on the basis of a single dimension. Alternatively, the II system is optimal for learning stimuli that vary along multiple dimensions. Researchers have traditionally studied these systems by comparing performance between RB and II tasks, which require

use of the RB system or the II system, respectively. However, these systems have only been studied within the visual domain. The present research expanded on the established paradigm by asking participants to learn RB and II category tasks for stimuli that vary along visual and auditory dimensions. The participants were able to learn RB tasks faster and with higher accuracy than II tasks, which is consistent with previous research, but they were able to learn the II boundaries even though it required the integration of multiple sensory modalities. The findings suggest that the RB category learning systems can discover rules in multiple sensory modalities, and the II learning system can integrate information across senses. The findings expand our understanding of when humans integrate information across sensory modalities, and how this affects categorization.

Student

Alexander Levine 

Major

Theatre Anthropology – The Russian Experience

Research Mentor

Dr. Tedlock

Title

Russian Entrepreneurial Identity

Abstract

This research will fill in gaps of understanding as to how the entrepreneurial processes manifest itself in the relations of Russian entrepreneurs with the state. Alexei Yurchak has written about how Russian businessmen learned the entrepreneurial process under the existence of the Soviet Union using a concept that he calls “entrepreneurial governmentality.” I will be exploring the continuity of this cultural process as well as the emergence of a new kind of entrepreneurial identity among the younger generation and the tension and conflict that has emerged between entrepreneurs that have learned their entrepreneurial talent during the Soviet-era and the younger generation of entrepreneurs.



2012

Student

Lauren M. Little *H*

Major

Anthropology and Biomedical Sciences

Research Mentor

Dr. Ann McElroy

Title

Cultural Perceptions of Health and Healthcare in Brazil

Abstract

In 1988 Brazil adopted a healthcare system that the United States has considered for many years: universal healthcare. In response to government instability causing inaccessible and unaffordable health care, the Brazilian people demanded a health system that would provide quality and affordable healthcare to all people. Cultural values play a significant role in the development and structure of health care systems. To better understand these establishments, ethnographic research can be conducted on groups of people to gain insight into cultural perspectives and beliefs. The purpose of this project is to better understand how Sistema Único de Saúde was developed and how the perspectives of Brazilians influence the practices and methodology of the system.

Gathering the perspectives of Brazilians through ethnography provides the cultural background for why Brazilian healthcare has developed the way that it has. Understanding the cultural significance of the healthcare system can help clarify the bigger picture of understanding, more generally, the pressures that health places on a population. The results of this research demonstrate the differences of cultural perceptions of health and health care ideology between Brazilians and Americans.

Student

Rosaleen McAfee

Major

Anthropology

Research Mentor

Dr. Phillips Stevens

Title

Neo-Paganism in Western New York: How and Why People Practice Celtic Spirituality

Abstract

I propose to research one form of the Neo-Pagan religion, that of Celtic Neo-Paganism, and the ways in which people practice this form of spirituality in Western New York. Celtic Neo-Paganism specifically refers to the practice of Neo-Paganism focused in a modern Celtic context. I am interested in people both with “Celtic” heritage and those without. I am also interested in what religious beliefs, if any, people practicing Celtic Neo-Paganism originally held, or what their families practiced in the past. I would like to know how practicing this form of spirituality has allowed people to feel more connected with their “Celtic” heritage. Through my research, I hope to further understand what causes people to create, adopt, and reject religious beliefs. This will also further allow anthropologists to understand the selection of this particular belief and its relationship with people’s cultural heritage.

Student

Adam Mckay *C*

Major

Chemistry/Math

Research Mentor

Dr. Janet Morrow, PhD

Title

Characterization and Luminescence of Biologically Relevant Lanthanide

Abstract

For the past twenty years, there has been extensive research devoted to the study of lanthanides as luminescent sensors, particularly with regard to biological metabolites and magnetic imaging. The most well-known lanthanide to be used in medicine is Gadolinium – one of the

most used contrast agents in Magnetic Resonance Imaging (MRI). Other lanthanides, like Europium, Terbium, and Neodymium, have shown great promise in the detection of biologically relevant metabolites through the exploitation of their unique luminescent and absorption properties. Results of this experiment have already suggested that europium and terbium can be used to accurately quantify the presence of serum albumin and phosphates, and further experimentation with neodymium, along with other biologically relevant metabolites (such as citrate), are currently underway.

Student

Caitlin McLeod *C*

Major

BFA Design Technology Theatre, BA Fine Arts

Research Mentor

Cathy Norgren

Title

Clothing as Performance

Abstract

For this research project I discovered the performative qualities of clothing, and how the nature of the clothing can inform the production. Specifically I have played with the use of unusual materials, found objects, and mixed media constructions. Through experimentation new uses of clothing items became discovered, and I soon developed a performance piece that was founded fully on the way the clothing was used in the production.

Student

Caitlin McLeod *C*

Major

BFA Design Technology Theatre, BA Fine Arts

Research Mentor

Dyan Burlingame

Title

Live Design



2012

Abstract

Through attendance at the Kennedy Center American College Theatre Festival Region II conference myself and a group of others were able to present our portfolios to professionals in the theatre industry. We not only got feedback on our paper portfolios but also developed the skills and knowledge on how to create a successful online portfolio. The challenge we all were faced with was how to translate a live design onto a still media effectively. Through various discussions and round tables we were able to come towards an individualized solution for each of our portfolios.

Student

Caitlin McLeod 

Major

BFA Design Technology Theatre, BA Fine Arts

Research Mentor

Lynne Koscielniak

Title

Prague Quadrennial of Performance Design and Space

Abstract

For this research project I attended the Prague Quadrennial, where I not only viewed the international exhibition of performance design, but also participated in a site specific performance in the Franciscan Garden in Prague. This production was created through the collaboration of over 20 students from all over the world, under the direction of Pavel Stourac. This project opened me up to the world of stage design as well as the process of a collaborative theatre piece. Along with the theatrical discoveries I also viewed art exhibits and public art pieces in Europe, gaining a global appreciation for fine art as well. The purpose of the project was to develop a greater understanding of the relationship between fine art and theatre performance, which I fully explored.

Student

Matthew Oliner

Major

Theater Design and Technology

Research Mentor

Lynne Koscielniak

Title

Esp Vision, A Recreation of Master Art Works

Abstract

My research is in lighting simulations. Lighting simulation is creating a digital rendering of the stage with light before moving to the actual stage. To achieve this goal I went to a conference in Florida called The Lighting Design Institute (LDI). While at LDI I meet with the men who created the ESP Vision program. While getting the program up and running I ran into a few snags and had to learn how to network two computers together. In networking the two computers I created a virtual stage and light board. To share my research with my fellow classmates and other schools, I will present the info I learned at the Kennedy Center American College Theater Festival and at the Celebration of Academic Excellence. With this technology I can communicate my pre- production lighting ideas for my upcoming show Grease that will be produced at UB in April.

Student

Jill Romano 

Major

Anthropology, Economics, Spanish

Research Mentor

Dr. Philips Stevens

Title

The Economic Adjustment of Sudanese Refugees

Abstract

Each year, thousands of refugees enter the United States hoping to find a better life. The segment of the story that is more often told in popular culture is the

struggle that the refugee goes through in his or her native country. The story that is not as often told is the struggle that refugees continue to go through even after reaching the “promised land” of the United States. My research tells the second half of the refugee’s story. It focuses on the experiences of refugees from the Didinga tribe of South Sudan and looks at how their native culture effects their adaptation to the economic culture of the United States. Certain issues include budgeting, finding a job, or buying on credit. It also addresses the effectiveness of social programs that currently exist to help refugees with this adjustment.

Student

Bryan Sim

Major

Psychology

Research Mentor

Dr. Lora Park

Title

Effects of perspective taking on system justifying beliefs

Abstract

System justifying beliefs impede attempts to reduce prejudice and discrimination by opposing changes to the status quo, even if it is discriminatory in nature. This series of studies examines the effects of perspective taking on system justifying beliefs. Participants take the perspective of a homeless man before completing measures assessing their self-reported empathy, perceptions of a just world, support for the status quo, collective guilt, attitudes toward the homeless, and endorsement of victim enhancing/victim blaming traits. Potential moderators for the effects of perspective taking such as the valence of perspective taking (e.g., focusing on the positive or negative aspects of the target’s life), system threat, and interpersonal similarity are examined.



Student
Katherine Spoth 

Major
 Physics and Mathematics

Research Mentor
 Dr. Arnd Pralle

Title
Characterization of magnetic field nanoparticle heating for remote control of ion channels

Abstract
 When heated in radiofrequency magnetic field, superparamagnetic nanoparticles create a local temperature increase sufficient to cause the opening of temperature sensitive ion channels in the membrane. This requires high local concentration of particles on the membrane, and occurs on a timescale of tens of seconds. With the goal of improving this heating process, we wish to better characterize the heating of these particles as a result of their spacing. To achieve this, we plan to arrange particles in a regular lattice formation through the use of DNA self-assembly, allowing precise control of the particle spacing. Alternating magnetic field will be applied to the particles, and the local temperature determined through variations in fluorescence intensity that occur with change in temperature. We will determine which particle spacing heats most effectively, eventually building lattices on the surface of cells for membrane heating. Currently, work has focused on optimizing the apparatus for application of magnetic field and on computer simulations of the particles' heating.

Student
Matthew Sydor

Major
 Psychology

Research Mentor
 Dr. Rina Eiden Ph.D; Meghan Casey

Title
Observed Parental Warmth of Alcoholic Parents

Abstract
 An alcoholic parent can be detrimental to the family's wellbeing. According to research by Moos and Billings (1982) these families report a higher amount conflict and a lower quality of parenting. This study examined the relationship between fathers' alcohol use and the amount of parental warmth shown to their children. A sample of 150 fourth grade children (55% female) and their fathers (55% alcoholics at 12 months child age) were recruited from birth records. During an observed session, children and their fathers completed a "happy task" in which the dyads were asked to discuss the things they really liked about one another and about their family as a whole. The degree of parental warmth was measured using an adaptation of the IOWA Family Interaction Rating Scale, in which higher scores reflect greater levels of parental warmth. Results of a 2x2 ANOVA showed a significant difference between the alcoholic group (M=5.4623, SD 1.01481) and the control group (M= 5.8426, SD 0.73348, $p < .05$) with a moderate effect size ($d=.4295$). There was no main effect of gender or interaction between alcohol status and gender. Results suggest that father's alcohol problems may be a predictor of lower parental warmth.

Student
Alia Syed

Major
 Biological Sciences

Research Mentor
 Dr. Zale Bernstein

Title
Information Satisfaction And Distress In A Low Ses Cancer Population: Identification Of Critical Educational Domains

Abstract
 At diagnosis and throughout treatment, cancer patients are confronted with requirements to manage large amounts of complex information and the need to use this information to make high stakes medical decisions. Faced with this dual challenge, the identification and evaluation of the complex relationships between satisfaction with treatment information and patient distress is critical. This is particularly important given the documented relationship of information satisfaction and distress with patient quality of life (Davies et al, 2008) and compliance (Bikker et al, 2006). Despite the importance of these associations, few studies have examined these relationships in low SES and minority patient populations in order to empirically identify critical patient educational domains. Using standardized measures, the present study evaluated distress using the NCCN Distress Thermometer, and information satisfaction in five critical areas and overall satisfaction, using the Information Satisfaction Questionnaire. Correlational analyses identified educational content domains characterized by lower levels of satisfaction and significant associations with higher levels of distress. As such, these domains capture and identify critical content for the development of educational interventions targeting the enhancement of information satisfaction, reduction of distress, and improvement of treatment compliance and patient quality of life.

Student
Stefan Truex 

Major
 Geological Science

Research Mentor
 Dr. Jason P. Briner

Title
Dating Greenland Ice Sheet Margin Change



2012

Abstract

By the end of the 21st century, the Greenland Ice Sheet (GIS) is projected to be the largest single contributor to sea-level rise. Forecasts of sea-level rise, however, are contingent upon the ability of ice-sheet models to predict future ice-sheet change. Ice-sheet models must be able to reconstruct past ice-sheet behavior, to accurately make future predictions. Geological reconstructions of past GIS behavior that place GIS extent at a particular location at a known time, can serve as important benchmarks for testing ice-sheet models, and ultimately improve sea-level rise forecasts. Therefore, accurately constraining fluctuations of the GIS margin has clear implications for accurately predicting future GIS-margin change. Radiocarbon ages from a lake cored in Kangerlussuaq, West Greenland, are able to accurately constrain the timing of GIS fluctuation, and ultimately, improve ice-sheet models.

Student

Stephen Ungvary

Major

Psychology

Research Mentor

Dr. Julie Bowker

Title

Social withdrawal and psychological distress during early adolescence: Examining the moderating effects of rejection-sensitivity

Abstract

This study examines the associations between anxious-withdrawal (e.g., shyness) and psychological distress during early adolescence, and whether rejection-sensitivity moderates the associations. Research indicates that anxiously-withdrawn children and adolescents suffer psychologically. Rejection-sensitivity (RS) is a social-cognitive processing bias that also has been linked to psychological distress. This is the first study to investigate whether RS exacerbates the psychological risks

associated with anxious-withdrawal. 150 adolescents (Mage = 13.05) participated and completed peer nomination measures of anxious-withdrawal and peer experiences and self-report assessments of RS, three types of social anxiety (fear of negative evaluation, social avoidance-new situations, social avoidance-general) and self-esteem. A series of hierarchical regression analyses, controlling for social preference and victimization, revealed that RS was positively related to fears of negative evaluation and low self-esteem ($ps < .04$). Two significant interaction effects were also found: (1) anxious-withdrawal-x-RS when predicting social avoidance-new; and (2) anxious-withdrawal-x-RS when predicting social avoidance-general. Simple slopes analyses revealed that anxious-withdrawal was related to the outcomes at high and medium levels of RS ($\beta s = .31-.60, ps < .001$), but not at low levels ($\beta s = .02-.08, ps > .52$). Findings strongly suggest that anxiously-withdrawn young adolescents who are also rejection-sensitive are at the greatest risk for psychological maladjustment.

Student

Kai R. Wasson

Major

Anthropology & Asian Studies

Research Mentor

Dr. Philips Stevens

Title

Community Theater as a Vehicle for Cultural Competence as it Intersects Health Care and Refugee Acculturation

Abstract

My research project focused on a production by the Ujima Theatre Company that involved refugee men and women who are now living in Buffalo. The final product of the theatre consisted of these men and women being on stage, telling the audience about who they are, where they came from, why they had to leave their country, and their experiences

living in Buffalo. Their experiences in Buffalo were focused on health: health problems they have had, how they got their medical needs met, and what problems have they faced in trying to meet their medical needs. My research looked at the efficacy of the model of presentation developed by Ujima in educating the wider community about cultural competence, which if successful, can improve our health care system, overcome the social determinants of health, and better incorporate the growing refugee population into society.

Student

Heather Zyla

Major

Psychology

Research Mentor

Dr. Julie Bowker

Title

Shyness and Psychosocial Maladjustment: Investigating the Moderating Role of Overprotective Parenting during Adolescence

Abstract

This study evaluated the associations between shyness and psychosocial maladjustment (anxiety, depression, social problems), and overprotective parenting as a moderator. Past research indicates that overprotective parenting can exacerbate the psychosocial difficulties associated with shyness during early childhood. This is the first study to test whether overprotective parenting poses a similar risk for shy adolescents. 140 adolescents (Mage = 13.79 years) participated and completed measures of shyness, psychosocial adjustment, and overprotective parenting. A series of hierarchical linear regression analyses revealed significant main effects for shyness when predicting anxiety, depression, and social problems ($ps < .05$). Two significant interaction effects were also found: (1) shyness-x-overprotective parenting when predicting social problems; and (2) overprotective



2012

parenting-x-sex when predicting anxiety. Simple slope analyses revealed that shyness and social problems were significantly related at high ($\beta = 0.27, p = .001$) and medium ($\beta = 0.33, p = .002$) levels of overprotective parenting, but not at low levels ($\beta = 0.13, p = .30$). Also, overprotective parenting was related to anxiety for girls ($\beta = 0.27, p = .001$), but not for boys ($\beta = -0.04, p = .65$). Findings suggest that overprotective parenting is negative for shy youth not only during childhood but also adolescence.

C-STEP PROGRAM (COLLEGIATE SCIENCE AND TECHNOLOGY ACHIEVEMENT PROGRAM)

Student
Hector Coco

Major
Civil, Structural & Environmental Engineering

Research Mentor
Dr. James Jensen

Title
Solar Power Installation on Riverbend Commerce Park

Abstract
The U.S. Environmental Protection Agency has taken a strong stand in decreasing the exponential rate of global warming and increasing the production of free energy through renewable energy. In order to increase sustainability and reduce global warming, renewable, non-carbon energy resources (such as solar energy) are needed. A major focus has been directed towards generating electricity by placing photovoltaic panels on the open space provided by closed landfills. In this study, photovoltaic panels were evaluated in closed landfills based on:
1. weight consideration,
2. penetration damages to the geomembrane of the landfill, and
3. side-slope stability, due to wind loading and snow loading.
The three pre-existing systems were evaluated for addressing these challenges to use ballasting, pre-casting concrete footing and providing solar energy cover. In cooperation with the Buffalo Urban

Development Group (BUDG), the most efficient system to address the side-slope stability on the Riverbend Commerce Park in downtown Buffalo was used.

Student
Jonathan Feliciano

Major
Psychology

Research Mentor
Dr. Mark D. Seery

Title
Aggression and Self-Esteem Stability

Abstract
People with fragile high self-esteem may use aggression as a tool to aid in rebuilding their positive self-view following the activation of underlying self-doubt. Participants were given the opportunity to aggress after receiving negative feedback on a test and being lead to believe they were socially rejected by a fellow participant, by distributing a highly disliked food to the participant who ostensibly rejected them. We hypothesized that participants with fragile high self-esteem will aggress by distributing a larger amount of the disliked food. Additionally, if the act is successful, it should bolster self-views and produce a positive physiological response.

Student
Tavia Garvey

Major
Pre- Pharmacy

Research Mentor
Dr. Qing Ma

Title
Neurocognitive Disorders in Patients with HIV infection

Abstract
Numerous patients with Human Immunodeficiency Virus (HIV) are given prescriptions to reverse the effects on the

body by the virus or the antiretroviral agents to treat it. Our study was taken from four cities: Cleveland, Miami, New York, and Rochester. The patients reported the drugs they were prescribed to treat the virus, the psychotropic medication, and whether or not they are substance abusers. The reason why we focused on the psychotropic medications for the central nervous system is because it seemed to be the most impacted out of all the other systems. Our knowledge of the neurological medications helped us to assess the nervous system disorders that the patients were having. Some patients had more than one disorder that affected multiple organ systems, while other patients had multiple disorders of the CNS, but depression seemed to be the most prevalent. Since forty-seven percent of the patients in this analysis were substance abusers, we compared our findings in substance abusers versus non-substance abusers. Then we compared the significance of our findings by running statistical tests.

Student
Richard A. Hunte

Major
Biomedical Sciences

Research Mentor
Dr. Randall L. Rasmusson

Title
Interaction of 17 β -estradiol with Cardiac Kv1.4 Channels Expressed Xenopus Oocytes

Abstract
Kv1.4, is a Shaker-related voltage-gated K⁺ channel and is responsible for a rapidly inactivating, slow recovering transient outward current (I_{to}) during phase 1 of the cardiac action potential and in other excitable cells. Its expression in the heart is upregulated in hypertrophy and heart failure. This channel consists of four identical subunits that form the channels' pore. Each subunit has a putative structure of six-transmembrane spanning domains including a charged



2012

voltage-sensing segment. There are several reports describing sex differences in the physiology and pathophysiology of the cardiovascular system. Mechanisms of these sex-related differences are not well understood, although they are likely to be influenced by gonadal steroid hormones. Recent studies have reported sex differences in the expression of ion channels in healthy human hearts, particularly a significant difference of Kv1.4 expression between males and females. This study investigates the influence of 17 β -estradiol on the kinetics of Kv1.4 channels expressed in *Xenopus levis* oocytes using a two-electrode voltage clamp technique. Understanding the Kv1.4 channel is important in understanding cardiac physiology and pathology, since it is a major site for drug binding and a substantial influence on the cardiac action potential.

Student
Shanney Lacey

Major
Industrial and System Operations
Engineering

Research Mentor
Ann Bisantz, Ph. D.

Title
Studying the Impact of Interoperable Health IT on Workflows in Ambulatory Care

Abstract
Health Information Technology (HIT) suggests various benefits towards the efficiency of Ambulatory care. These benefits arise not only due to the electronic format of managing information, but also the interoperability of systems in the information network. It is anticipated that the implementation of HIT at clinical practices would have an impact on healthcare practitioners' workflow. A thorough understanding of how these electronic health record systems affect day-to-day work practices, is required to assess to what extent Health Information Technology is meeting projected improvements and effects. To identify the effectiveness of these implementations, this study analyzed qualitative content from the interviews of staff for 13 primary and specialty

practices. Codes were developed using a grounded theory approach by iteratively reviewing content. Individual researchers used applied codes to describe data obtained from the opinions on the impact of technology on workflows. The aim of the qualitative analysis is to highlight the various issues regarding the transition and implementation of HIT in clinical practices.

Student
Gael Lamothe

Major
Civil engineering

Research Mentor
Dr. André Filiatrault

Title
Comparison of Concrete Masonry Unit(CMU) from Haiti VS United States

Abstract
On January 12, 2010, Haiti was hit by an earthquake which caused the destruction of many buildings. One of the reasons for this destruction was due to the poor quality of the Concrete Masonry Unit (CMU) used to build them. At the Multidisciplinary Center for Earthquake Engineering Research (MCEER), the compressive strength of the CMUs manufactured in Haiti were compared against those from the United States(US). Six sets of blocks from Haiti and two set of blocks from the US were used. Each sample was tested according to the ASTM C1716 standard. Based on the results, it can be recommend to the Haitian engineers to upgrade the quality of the materials used to produce the CMUs and to buy CMUs from Pfab, a CMU brand from Haiti.

SCHOOL OF ENGINEERING & APPLIED SCIENCES

Students
Derek Brim, Meredith Canty, and Joshua Ulrich

Research Mentor
Dr. Jennifer Zirnheld

Title
Repetitive Pulse Testing and Modeling of a High Power Ceramic Resistor

Abstract
In an effort to understand the failure mechanisms of ceramic resistors when used above their stated limits, a series of pulsed load profiles were applied to an epoxy coated ceramic resistor. A dependent relationship between the pulsed load profiles and the temperature of the epoxy was shown through the series of experiments. From these experiments a safe operating range was found beyond the stated limits. The load profiles that cause failure are evaluated and compared to the results of a lumped element numerical model, which models the thermal characteristics of such a resistor under test and allows for the heating profiles during operation to be predicted.

Student
Oluwatobi Busari 

Major
Aerospace Engineering and Physics

Research Mentor
Dr. Deborah D Chung

Title
Characterizing the ability of new Carbon-Carbon composites to withstand high temperatures

Abstract
Carbon/carbon (C/C) composites are important as high-temperature lightweight structural materials, as used for reentry vehicles, missiles and aircraft brakes due to their attractive thermomechanical properties. These properties pertain to the behavior of these materials under both heat and stress – a condition that is relevant to practical applications. However, they suffer from high processing cost, because of the techniques required for the mechanical and thermal properties sought. These processes involve multiple impregnation-carbonization cycles using organic liquid impregnants as carbon matrix precursors and methods such as chemical vapor infiltration (CVI). These processes are conducted in order to achieve sufficient densification – increase



2012

in density. In addition, C/C composites suffer from low ductility, due to the brittleness of the carbon matrix as well as susceptibility to oxidation depletion at high temperatures since carbon begins to oxidize at measurable rates at approximately 371oC [1]. Quality C-C composite materials obtained without densification have been recently achieved in the laboratory of Professor Deborah Chung of UB through the use of fillers. The proposed experimental research is aimed at characterizing the ability of these new C-C composites to withstand high temperatures. Comparison with corresponding data for C-C composites without filler but with densification will be made.

Student
Peter Byrley \mathcal{C}

Major
Environmental Engineering

Research Mentor
Dr. David Blersch

Title
Assessment of a Floating Algae Cultivator For Water Pollution Control and Biomass Production

Abstract
The research proposed here is to optimize the design of a floating cultivator for attached filamentous algae for applications in the lower Great Lakes region. Eutrophication of waterways in the Great Lakes region has become a significant water quality issue in the past few decades. At the same time, process design for attached algae cultivation has matured and proven to be effective for water quality management in other regions of the country. Preliminary investigation using pilot-scale units on the Buffalo River, however, has shown relatively low rates of biomass production despite high energy inputs, suggesting limited application of this technology in the region. Thus proposed is a novel floating algae cultivator which has shown promising biomass production at

low energy cost in previous applications elsewhere. The proposed design has small capital costs, requires no energy input for operation, and recovered biomass from the apparatus has the potential to be used as a feedstock for biofuel production. Results of studies on the performance of the apparatus will inform the development of design and operational parameters for viable large-scale algal production for water quality mitigation in the lower Great Lakes watershed.

Student
Belle Cunningham

Major
Chemical Engineering

Research Mentor
Dr. Folarin Erogbogbo

Title
Silicon Nanocrystals as an energetic material for the hydrogen economy and as a fuel additive

Abstract
Interest in energetic nanomaterials has grown in recent years due to the need to generate more power for growing populations and the initiatives to find suitable alternative fuels. However, nanomaterials have not been well studied. Here, we explore two demonstrations of nanosilicon as an energetic material. Firstly, we investigated silicon as a solid fuel by exploring silicon and nitrate reactions. The energy released when silicon reacted with nitric acid (HNO₃) was characterized by its emission spectrum. The nanocrystals enhance the characteristics of this highly exothermic reaction because of their large surface area to volume ratio. The results shown are promising, indicating that silicon nanocrystals can be used as oxidizers for solid rocket fuel propellants and air bag deployment. Next, we use silicon to generate hydrogen, which can be used as energy for fuel cells. Hydrogen was generated from the reaction of silicon nanoparticles with hydrous hydrazine (N₂H₄). Hydrazine's light weight and

high gravimetric hydrogen storage capacity makes it desirable for transport of hydrogen; the release of hydrogen from hydrazine was more easily accomplished with silicon nanocrystals than with traditionally expensive platinum group metals. The work shows unexplored uses of silicon nanoparticles and their potential to make impactful contributions to Nano-energetics.

Student \mathcal{H}
Rachel DeMayo and Daniel Salem

Research Mentor
Dr. Kenneth Takeuchi and Dr. Amy C. Marschilok

Title
Interrogation of Substrates using Scanning Electrochemical Microscopy

Abstract
Scanning electrochemical microscopy (SECM) is a unique scanning probe technique that can provide a great deal of information concerning solid surfaces. This method employs the use of an ultramicroelectrode that is scanned over a solid sample while recording the observed Faradaic current. The magnitude of the observed current is a function of the reaction kinetics, the surface reactivity/conductivity, and the electrode-surface distance. This study discusses scanning electrochemical microscopy as it relates to the investigation of insulating and conducting materials.

Student
Jodie-Ann Duquesnay \mathcal{C}

Major
Mechanical Engineering

Research Mentor
Dr. Jun Zhuang

Title
Social Media and Disaster Preparedness



2012

Abstract

The use of social media in regards to disaster preparedness and response has become a new phenomenon in society. An increasing amount of response agencies are now creating accounts on an array of social media platforms such as YouTube, Facebook, Twitter and all other forms of online databases such as Google and Yahoo to relay safety information, and hazard advisories all in a timely manner. The purpose and anticipated result of this project is to raise awareness of the benefits; saving lives, and reducing costs both financial, and economically that can come from using social media in response to disaster preparedness and response, which I believe in confidently will result in more and more agencies choosing this method of action.

Student

Sourobh Ghosh \mathcal{H}

Major

Mechanical Engineering and Economics

Research Mentor

Dr. Kemper E. Lewis

Title

Advocating a Social Media Based Comprehensive Method to Universal Design

Abstract

Between now and 2030, the forces of population aging will significantly alter the demographic portrait of the world. Despite this reality, industry has done relatively little to prepare itself to fulfill the needs of the high-median age populations of tomorrow. To meet this challenge, industry must adopt the non-nascent yet continuously developing practices of universal design. We examine some of the specific reasons why industry has been reluctant to adopt the practices of universal design, and as a solution to this problem, advocate the development of a standardized, comprehensive method to universal design. This method would serve as an educational tool to managers and designers alike and would provide

the guidance necessary for companies to transition to the paradigm of universal design, allowing them to deliver a better product experience to all potential consumers. Part of this comprehensive method will entail extracting consumer preferences from social media via the application of a multiattribute decision making method, namely the hypothetical equivalents and inequivalents method (HEIM). By applying HEIM to social media, companies will have the ability to efficiently and accurately assess market needs in real time.

Student

Elizabeth Hennessey \mathcal{C} \mathcal{H}

Major

Environmental Engineering

Research Mentor

Dr. David Blersch

Title

Determining Biofuels Potential for Cultivated Filamentous Algae for Water Quality Management

Abstract

Excess nutrients in natural waterways have been known to cause water quality problems, and low-cost, sustainable technologies for nutrient removal are sought. For the past two growing seasons (approximately June through December), reactors for cultivation of attached filamentous algae have been operated at the Great Lakes Center in Buffalo, NY in order to assess the possible implementation of this technology for the removal of excess nutrients in Lake Erie and its surrounding waterways. The harvested algal biomass will be analyzed for potential fermentable sugars for assessment of biomass value for a biofuels feedstock scenario. The results will be used to inform a life cycle analysis of algae production for combined water quality management and biofuels production in western New York.

Students \mathcal{H}

Matthew Huie, Cassandra Whitford

Major

Chemical Engineering

Research Mentor

Dr. Kenneth J. Takeuchi, Dr. Amy C. Marschilok

Title

The kinetics of the oxygen reduction reaction

Abstract

The oxygen reduction reaction has recently become one of the most widely studied electrochemical reactions due in part to its applicability to air battery systems. However, many facets of the oxygen reduction reaction need to be investigated. For example, the kinetics of the oxygen reduction reaction needs to be understood in order to enhance the rate associated with oxygen reduction. The use of electrochemical techniques to probe the kinetics will be discussed.

Student

Yachen Liao \mathcal{C}

Major

Civil & Structural Engineering

Research Mentor

Dr. Stuart Chen

Title

Computer Modeling to Accelerate Construction of Bridges

Abstract

Steel bridge industries design and manufacture components that are used to build steel bridges. But after manufacturing steel girders and other components, construction workers typically have to manually pre-assemble them at the fabrication site to examine whether all the parts meet the assembly specifications within tolerance requirements. Due to this laborious procedure, many companies spend a lot of money, effort and time on it.



2012

Autodesk Inventor is 3D mechanical solid modeling design software for creating 3D digital prototypes used in the design, visualization and simulation of products. We will investigate applying its functionality to a case study bridge structure to help assess this type of software's potential usefulness in replacing physical assembly with a virtual assembly.

The benefits, by 3D modeling and testing all the components of a bridge in design software, will reduce significant amount of time, money and labor involved in building bridges. The rewards, universally, will allow companies to speed up the manufacturing process of a bridge and provide better and safer bridges for our society.

Student
Regina May

Major
Computer Engineering

Research Mentor
Dr. Bina Ramamurthy

Title
Using the Cloud for Disaster Recovery

Abstract
Cloud computing describes services available to users where information is accessible from multiple computers over a network. This tool is designed to allow users to upload information from their computer to the cloud to be accessible in the event of data loss. It is powered by Amazon Web Services (AWS). Users will be able to upload files from their computers to be stored in the cloud. The user can also store as much their whole hard drive on the cloud. If something were to happen to the user's computer, that person will be able to retrieve their information from another computer. The appeal of this tool is that these services can be accessed from a web browser from any computer. This method is cost efficient and serves as a prototype that can be used by larger companies.

Student
Benjamin McPherson

Major
Environmental Engineering

Research Mentor
Dr. Christopher Lowry

Title
Laboratory and Numerical Simulation of Vertical Ground Water Flow and Heat Transport Using Distributed Temperature Systems

Abstract
Measurements of heat transport via groundwater flow have become an important tool for hydrogeologists and environmental engineers over the last fifty years. By measuring heat fluxes in the subsurface, groundwater/surface water (GWSW) interaction can be identified and quantified. Being able to identify areas of GWSW interactions are important when working on stream restoration projects that involve tracing pollutants or determining potential sites for habitat creation. In recent years hydrogeologists and environmental engineers have turned to distributed temperature sensing (DTS) to measure GWSW interactions. These systems have been shown to produce high resolution temperature profiles over great distances when applied horizontally along streams. DTS systems have also been used in the field to measure heat transport in the vertical direction by coiling the DTS cable around a rod or pipe. By coiling the cable around the rod the resolution data collected is even further increased, potentially being able to return a measurement every 3 cm. The purpose of this project is to test the vertical DTS technique in a laboratory setting and compare the results from those tests with those produced by a numerical model of groundwater heat transport.

Student
Elizabeth A. Newell \mathcal{C}

Major
Industrial and Systems Engineering

Research Mentor
Dr. Jun Zhuang

Title
Game Theoretic Application to Disaster Preparation and Mitigation: Hurricane Case Study

Abstract
Natural Disasters have become a part of modern life leaving behind them damages and human casualties. With the recent Hurricane season claiming the lives of numerous people and costing billions of dollars in property damages (e.g. Hurricane Irene claimed at least 38 lives and cost over \$1 billion dollars in damages), the debate about emergency preparation and mitigation becomes critical. Social media has become increasingly important to emergency managers in the recent natural disasters, and is projected to become even more essential for future disasters. For Hurricane Irene, evacuation orders were issued by the government in areas that were projected to be hit by the category 4 hurricane. However, most of the 38 deaths attributed to Hurricane Irene were due to not adhering to governmental warnings. This research develops a model where the government and private citizens strategically interact with each other in a disaster scenario. The government chooses to advise its citizens to evacuate or not, and the citizens choose whether to follow the government's advisement. By studying this strategic interaction, this research provides some novel insights on the optimal/equilibrium strategy for both players based on their preferences and social media interactions.

Student
Justin Storms \mathcal{H}

Major
Mechanical Engineering

Research Mentor
Dr. Tarunraj Singh

Title
Design, Fabrication and Testing of Two Spring-Mass-Damper Absorbers



2012

Abstract

This project explores the principles of dynamic vibration absorbers through an experimental setup. First, a one degree of freedom main spring-mass-damper system was designed and fabricated. The main mass sits on a compression spring and its path is guided by a rigid shaft. The main spring-mass-damper system is modular such that the mass of the system can be increased or the spring stiffness can be changed to give the system different natural frequencies. Next, a shaker table was designed and fabricated. By placing the main spring-mass-damper system on the shaker table, it is possible to give the system a periodic base excitation at various forcing frequencies and amplitudes. Following this, a set of two absorber spring-mass-damper systems were designed, fabricated and attached to the main mass system. The absorber spring-mass-dampers are in the form of cantilever beams with a mass at the end. By adjusting the position of the mass at the end of the cantilever beam, it is possible to tune the natural frequency of the absorber spring-mass-dampers. Using a data acquisitions system it is then possible to quantify the effectiveness of dynamic vibration absorbers at various natural frequencies.

Student

Lauren Stutzman

Major

Chemical and Biological Engineering

Research Mentor

Dr. Wolfram Jaegermann (Darmstadt University of Technology in Darmstadt, Germany)

Title

Analysis of Copper (I) Oxide Thin Films Deposited on FTO and ZnO/AZO Substrates

Abstract

Cu₂O could serve as a viable alternative absorber in thin film solar cells, because it functions a direct gap, p-type semiconductor that is low cost,

and environmentally friendly. For the following experiments, Cu₂O was deposited by magnetron sputtering on FTO and ZnO/AZO substrates, which served as n-type semiconductors, to produce thin film solar cells as semiconductor heterojunctions. Sputter deposition parameters, including deposition time, temperature, and atmosphere, were varied to produce Cu₂O films with different thicknesses, grain sizes, and copper to oxygen ratios. X-ray photoelectron spectroscopy was utilized to determine the copper to oxygen ratio in the Cu₂O layer. SEM revealed that higher deposition temperatures yielded larger grain sizes in the Cu₂O films. However, IV curve measurements indicated that neither Cu₂O films deposited on FTO substrates, nor Cu₂O films deposited on ZnO/AZO substrates produced functioning solar cells. However, Cu₂O films deposited on FTO substrates showed a slight diode-like behavior, and Cu₂O films deposited on ZnO/AZO substrates showed strong diode-like behavior. These finding suggested that with further research and experimentation these semiconductor heterojunctions may produce functioning solar cells.

Student

Phillip Tucciarone 

Major

Chemical and Biological Engineering

Research Mentor

Dr. Mark T. Swihart and Dr. Folarin Erogbogbo

Title

Silicon Nanoparticles for the Water Splitting and Novel Hydrogen Production

Abstract

In the hydrogen economy, pure hydrogen acts as an energy carrier which can be extracted from a multitude of energy sources. In the following, we examine the potential use of silicon nanoparticles as a mobile hydrogen source for prompt energy production. Activated silicon

nanoparticles can split water at an unprecedented rate, leaving H₂ gas and silicic acid as the only products. Reactions are carried out at room temperature, and initialized by the addition of water. Rates and production volumes are compared between different types of silicon, with the maximum rate of hydrogen production being produced by ~10 nm silicon NPs from laser pyrolysis. At least 2 moles of hydrogen was produced per mole of silicon at 100% conversion. This gas production was used to power an array of hydrogen fuel cells. The potential of these results lies in the novel supply of hydrogen on a small scale at normal temperatures, where compressed gas is not a viable option. Further, it is hypothesized that the entire process from particle synthesis to fuel cell use could be optimized to being carbon free.

Student

Sean Zawicki 

Major

Computer Science

Research Mentor

Geoffrey Challen

Title

Phonelab: A Participatory Smartphone Testbed

Abstract

The vision of Phonelab is to create smartphone testbed distributed throughout UB to students, faculty and staff. It will provide a realistic platform for experimentation amongst smartphones; enabling a broad range of tests to take place in a newly emerging area of computation. Phonelab will also provide experimenters with a large amount of cell phone information such as location, signal strength, battery level, etc. The testbed will also offers a readily available platform for experimenters to conduct their own experiments and collect new data.



Student
Shihe Zeng

Major
Chemical Engineering

Research Mentor
Dr. E S. Tzanakakis

Title
Stochastic Model of Stem Cell Differentiation

Abstract
Human embryonic stem cells (hESCs) are pluripotent cells with capacity to differentiate into many cell types such as heart muscle cells and insulin-secreting cells, which give great promises on future clinical use. So far one major issue in the application of hESCs is the lack of mathematical model describing this differentiation process. Here we developed a mathematical model to simulate the gene expression interaction between Nanog and Sox17 that are two critical genes in specifying hESCs into endoderm cells and further into insulin-secreting cells. Mathematically we employ Runge-Kutta method to solve stochastic differential equations with Nanog and Sox17 as equation variables. The model results conclude that as the expression of Nanog is suppressed in hESC differentiation, its inhibition effect on Sox17 is reduced, resulting in more hESCs differentiated into endoderm cells. The model results are in good agreement with experimental data and can quantitatively illustrate the effect of growth factors on hESC differentiation process.

SCHOOL OF MANAGEMENT

Students
Byung Hyun Ahn, En Yong Chen, Caitlin Curry, Jack Maserjian, Daniel Ovadia, Katherine Pizzutelli, Dominic Sellitto, James Wilder

Major
Business

Research Mentor
Brad Owens, Ph.D.

Title
The Interactive Effects of Trait Humility, Intelligence, Affect, and Core Self-Evaluation on Decision-making Biases and Scholastic Performance.

Abstract
The movement of positive psychology has spurred more attention toward classical human strengths such as humility. Humility has recently been operationalized as a higher order characteristic that comprises (1) a willingness to view oneself accurately; (2) teachability, and (3) an appreciation of others' strengths and contributions (Owens, Johnson, & Mitchell, 2012). However, empirical research on how humility influences human functioning is scant. In this study we report findings from three studies aimed at showing the effects of trait humility on decision-making biases and task performance. Study 1 revealed that humility interacts with intelligence to predict hindsight bias. Those with high levels of humility and intelligence (IQ) were least likely to display hindsight bias on a decision-making exercise. In Study 2, humility was shown to interact with core self-evaluation (a higher-order construct that reflects self-esteem, self-efficacy, internal locus of control, and emotional stability) to predict risk-seeking propensity. Simple slope analyses revealed that humility had a positive relationship with risk-seeking for those with higher core self-evaluation, but humility a negative relationship for those who had lower core self-evaluation. Study 3 revealed that humility only had a positive effect on undergraduate scholastic performance when coupled with high positive affectivity.

Student
Jason M. Zaklikowski

Major
Accounting

Research Mentor
David J. Murray

Title
Business Value Analytics for the Hospitality Industry

Abstract
The goal of this project was to create various business decision support tools for an industry leader in the hospitality industry. These tools incorporate elements of cost accounting, operational strategies, qualitative methods, and create business intelligence with a user friendly interface. Based upon the results of the tools, the items are classified using the Boston Consulting Group's Matrix, and suggestions are then made as to what treatment the menu items should receive. The underlying research incorporates some of the latest trends and theories in menu design, menu psychology, and costing methodology.

**RONALD E. MCNAIR
SCHOLARS PROGRAM**

Student
Akanimo Akpan

Major
Psychology

Research Mentor
Jennifer Read, PhD

Title
Are Male College Athletes Most at Risk for Binge Drinking?: A Longitudinal Analysis

Abstract
Previous research has provided some hypotheses about established norms and the differences, in these norms, between athletes and non-athletes. In addition, those studies help explain why there is more drinking and negative consequences among college athletes. However, there has not been an in-depth focus into the gender differences in these athletes' and how those may compare to the general



2012

population. This is important because these differences could affect personal alcohol use and the consequences that accompany such use could affect the eligibility of these athletes, in terms of the team's code of conduct, and affect their performance in sport. We speculated that there will be gender differences, among athletes, in alcohol consumption and therefore, differences in negative alcohol-related consequences e.g. lower grade point average.

Student

Edward Poon

Major

Computer Engineering, Electrical Engineering

Research Mentor

Dr. Shambhu Upadhyaya

Title

Whack-a-Mote: Simulating attacks on sensor network nodes and effects of compromised nodes

Abstract

With the advent of the earthquake in Japan, war on terrorism, and other calamities, the need for sensor networks grows. Sensor networks can be deployed to detect natural disasters, intruders, a patient's vital signs, etc and alert people ahead of time. The use of sensor networks is limited without proper security; just one compromised node can lead to the failure of the sensor network. This research will focus on attacks made on the individual sensor nodes that make up the sensor networks. The sensor network will be set up using TinyOS and programmed in nesC and I will use a routing protocol to send packets to each node, which in turn will light up when receiving the packet. I will make a game similar to "whack-a-mole" called "whack-a-mote." The player will hit each node that lights up to simulate the attack. Then I will place a corrupted node and see its effect on the sensor network. The results of this experiment are to show how quickly a node can be compromised and the effects of a compromised node on the network.

\mathcal{H} = Member of Honors College

Student

Yi Xin Ren

Major

Chemistry

Research Mentor

Dr. James F. Garvey

Title

Chemical reactivity, bonding and structure of the nucleophilic substitution of p-chlorofluorobenzene ions by ammonia

Abstract

The chemical reactivity within gas phase p-chlorofluorobenzene-ammonia heterocluster cations $\{(C_1F_1C_6H_4)_m(NH_3)_n\}^{1-8+}$ have been investigated via a triple quadrupole mass spectrometer and through DFT calculations. Collision induced dissociation (CID) experiments were performed in which mass selected cluster ions are accelerated into a cell containing argon gas and the resulting products then subsequently mass analyze. Two interesting reaction results are observed. The first is that the 1:1 peak is missing. Further investigation is underway to find out why this is the case. The second is survey from the CID experiments display the magic number for $(C_1F_1C_6H_4)_6^+$ with helium gas. The reactions between p-chlorofluorobenzene cation and ammonia involve intra-cluster proton transfer of ammonia giving clusters of high stability.

Student

Yun Zheng

Major

Medicinal Chemistry, Pharmaceutical Sciences

Research Mentor

Dr. Valerie Frerichs

Title

Analysis of Anions in Local Water Bodies

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 mostly from 2008 to present. Concentration of two critical markers, chloride and sulfate will be presented from four of these samples sites. Results indicated that even lakes within close proximity have markedly different anion content over a period of three 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

Alexandria E. Avery, Katrinne Anne D. Mariano

Research Mentor

Dr. Ji Li, PhD

Title

The anti-cancer agent Weiteichun is a novel and selective AMPK activator in prostate cancer cells that leads to a decrease in their viability

Abstract

Background: Our lab recently reported that the natural product Alternol selectively inhibited proliferation of C4-2 cells, an androgen-independent prostate cancer cell line¹. In the current study, we examined the potential effects

\mathcal{C} = CURCA Funded Project



of Weiteichun, a compound structurally similar to Alternol, on prostate cancer cells.

Method: The MTT assay was used to determine cell viability. Protein levels were measured through Western blotting.

Results: Multiple cell lines were treated with Weiteichun and their viabilities were assessed via MTT. C4-2 cell viability was drastically decreased after 24 hours of drug treatment compared to control. We then looked at AMPK as an explanation based on our lab's previous findings using Alternol. Weiteichun led to an activation of AMPK in C4-2 cells and an inhibition of AMPK in RWPE cells, which are non-tumorigenic epithelial cells derived from human prostate2. Pre-treatment with Compound C, an AMPK inhibitor, ablated Weiteichun's effect on C4-2 viability. AMPK activation in C4-2 cells led to an inhibition of the mTOR complex (an important mediator of cell growth) via phosphorylation of Raptor.

Conclusions: This is the first evidence presenting Weiteichun's selective anti-tumor effect on prostate cancer cells, which we suggest is dependent on its novel activation of AMPK.

Student
Nurul Hidayah A. Azmi

Major
Biotechnology

Research Mentor
Nicoletta Sacchi, Ph.D.

Title
Perturbation of Cellular Clock Affects Breast Acinar Morphogenesis

Abstract
Most physiological and biological processes are regulated in a circadian fashion through an endogenous clock that acts both at the organism level and the cellular level. The cellular clock consists of a set of core clock genes that oscillate with a 24-hour period and eventually control non-clock

genes involved in fundamental cellular processes. Both disruption of circadian rhythm and altered clock gene expression have been associated with breast cancer. By using a method to induce circadian oscillations in cultured cells, we found that the expression of key clock genes oscillate in a circadian fashion in breast epithelial cells (HME1), but not in breast cancer cells. HME1 cells can form mammary gland-like acinar structures in three-dimensional (3D) culture. Thus, we exploited the HME1 model to test whether disruption of PER2, one of the clock genes found affected in breast cancer that perturbs the cellular clock, can impair 3D acinar development. By using a mechanistic approach, we demonstrated that PER2 knock down, by negatively affecting the level of expression/amplitude of BMAL1 transcript oscillation, which in turn exacerbates PER2 downregulation, severely hampers the development of HME1 acini. This study provides the first evidence of clock gene-mediated regulation of the breast acinar morphogenetic process.

Student
Archis Bagati 

Major
Pharmacology and Toxicology

Research Mentor
Dr. Satpal Singh, PhD

Title
A novel mechanism of hERG potassium ion channel blockade: implications for drug design?

Abstract
The hERG (human Ether-à-go-go Related Gene) potassium ion channel is extremely critical for maintaining a normal heartbeat in humans. The inhibition of this channel by drugs may lead to cardiac arrhythmias resulting in sudden cardiac death. Therefore the FDA mandates a discontinuation of any drug in the development process that inhibits the hERG channel. As a consequence however, the mandate now accounts

for over 30% of novel compound discontinuations. Two key amino acid residues located intracellularly, a phenylalanine at position 656 (F656) and a tyrosine at position 652 (Y652) have been shown to be very important for binding of all drugs to the channel. This study indicates the presence of a potentially novel extracellular/alternative intracellular drug binding site, apart from Y652 and F656. Preliminary results have demonstrated that the inhibition of the hERG channel by Celecoxib, an analgesic prescribed for arthritis and acute pain, is independent of both these binding sites, a first observation of its kind. An increased understanding/identification of any novel molecular determinants of blockade of the hERG channel would allow for the refinement of the drug design process to bypass any interactions with the hERG channel. Thereby minimizing drug related cardiotoxicity (arrhythmia) and minimizing drug developmental costs.

Student
Matthew D. Behringer

Major
Biochemistry

Research Mentor
Steven J. Fliesler, PhD

Title
Retinal Degeneration in a Rat Model of Smith-Lemli-Opitz Syndrome is Caspase-Independent, and Involves Cathepsin D Up-regulation

Abstract
Treatment of rats with AY9944, which blocks the final step of cholesterol biosynthesis, provides an animal model of Smith-Lemli-Opitz syndrome (SLOS). This model exhibits progressive photoreceptor degeneration and cell death; the outer nuclear layer (ONL) is robustly TUNEL-positive, indicating photoreceptor apoptosis. We examined retinas from AY9944-treated and age-matched (2-mo old) control Sprague Dawley rats with regard to expression of cleaved Caspase-3 (Casp3, a cell death-



2012

associated protease) and cathepsin-D (CathD, a more general protease). Cleaved Casp3 was not detected in AY9944-treated or control retinas either by Western blot or confocal immunofluorescence microscopy analysis; however, etoposide-treated Jurkat cells (apoptosis control) were strongly immunopositive. By contrast, increased and geographically more extensive CathD expression was evident in AY9944-treated retinas, relative to controls, particularly in the retinal pigment epithelium, ganglion cells, and plexiform layers. CathD did not co-immunolocalize with glutamine synthetase (a Müller glia marker). We conclude that retinal degeneration in the AY9944-induced SLOS rat model is Casp3-independent and involves CathD up-regulation. The latter may be indicative of an autophagic response to oxidative stress, particularly in inner retina cells.

Students

Conor Bennett, Lauren Little, Angelia Stepien, and Ashlie Tam

Research Mentor

Denise Fedra, PhD

Title

The Effect of Cognitive and Interpersonal Stressors on Eating Behavior

Abstract

Interpersonal stressors are especially effective at stimulating consumption of energy dense comfort foods, which may contribute to overweight or obesity. One reason that people slow or stop eating is by habituating to the food. Stress may also influence energy intake by acting as a dishabituator, but is not known if mental arithmetic, Stroop task, and interpersonal speech stressors have different dishabituating properties. These tasks produce stress by different means; mainly, memory requirements, cognitive dissonance, and ego threat. The goal of this research was to test differences in the ability of cognitive and interpersonal laboratory stressors to dishabituate repeated presentations of

a comfort food. For this study, twenty-three adult females each completed three appointments where they engaged in motivated responding to earn portions of macaroni and cheese. Participants slowed their responding across time. After 24 minutes, one of three stressors was presented. Motivated responding for macaroni and cheese was determined after the stressor (putative dishabituator). There was an increase in responding after the stressors, but preliminary analyses suggest no significant difference in dishabituating properties by type of stressors. This suggests that both cognitive and interpersonal stressors can dishabituate eating behavior and increase energy intake at a meal.

Student

Rita Chan

Major

Biotechnology

Research Mentor

Paul K. Wallace, Ph.D.

Title

Six Color Nine Part Flow Cytometric Differential

Abstract

Detection of abnormal populations in the blood is critical to the screening, diagnoses, and prognosis of many hematological diseases. The ability to do a white blood cell manual differential by current methods has several limiting factors, such as low reproducibility, difficulty with hypocellular samples, and limited classification. Immunophenotyping by flow cytometry to cleanly identify leukocyte populations is not hindered by these limitations and has been used to identify the major lineages. Flow cytometry allows for an exponentially larger numbers of cells to be enumerated and analyzed. It facilitates the identification and classification of a variety of cellular subsets not detectable by current methods.

An objective of the project was to expand on this technique to identify 9

leukocyte populations. A 9 part, 6 color flow cytometric differential panel was developed enabling the differentiation of NK cells, B cells, naive and activated T cells, monocytes, basophils, eosinophil, neutrophils, plasmacytoid dendritic cells, blast cells populations. Each population was identified and quantified using a Boolean gating strategy. Peripheral blood from 10 healthy donors, and 10 patient bone marrow patients samples at differing disease states were analyzed and compared to our flow cytometric differential. The ultimate objective is to validate panel for clinical implementation.

Student

Kyle J. Cullen, Adolfo Fernandez, David Lafferty

Research Mentor

Dr. Ji Li, PhD

Title

The role of TUG in AMPK-mediated glucose uptake during hypoxia in cultured cardiomyocytes

Abstract

Background: AMPK senses energy levels in the cell, activating energy-producing pathways in times of metabolic need¹. One of these pathways is to increase glucose uptake via increased GLUT4 translocation². TUG is a protein that retains GLUT4³. Because of the possibility for pathway convergence, and the identification of two AMPK phosphorylation motifs on TUG, we believe that AMPK phosphorylates TUG and this acts as a mechanism for GLUT4 translocation in the heart⁴.

Method: HL-1 cells, an immortalized cardiomyocyte cell line, were induced into a hypoxic state by means of a hypoxic chamber. After treatment, immunoprecipitations (IP) and Western blots were performed to look and protein: protein interactions and protein levels, respectively.

Results: Hypoxia treatment significantly increased P-AMPK levels in HL-1 cells. IPs and Western blots showed for the

 = Member of Honors College

 = CURCA Funded Project



first time that AMPK interacted with TUG in HL-1 cells, and said interaction was increased after hypoxic conditions. We also saw novel phosphorylation of TUG followed by its dissociation from GLUT4.

Conclusions: We showed for the first time that AMPK interacts with TUG, further connecting the insulin and AMPK-mediated glucose uptake pathways. This interaction leads to TUG dissociation from GLUT4, which potentially is mediated through phosphorylation of TUG.

Student
Karen DeWispelaere  

Major
 Chemistry, Biochemistry

Research Mentor
 Dr. Amy Jacobs

Title
The Molecular Role Of The Gp41 Membrane Fusion Protein Of Hiv In Viral Entry

Abstract
 In order to gain entry into the host cell and also to spread infection within the host, HIV utilizes a mechanism that culminates in membrane fusion. The details of membrane fusion are not well understood, but recent evidence has shown that HIV may be endocytosed so that the membrane fusion step might actually occur inside endosomes, instead of at the plasma membrane. We do know that this process is mediated by the HIV transmembrane protein, gp41, which is part of the envelope complex on the virus or cell surface. Gp41 has been a formidable target for labeling for fluorescence microscopy, as common techniques like fluorescent protein chimeras result in a loss of function. By using a structure/function approach coupled with detailed mutagenesis scanning we have for the very first time successfully inserted a peptide into the HIV gp41 protein sequence without affecting its functional activity in membrane fusion. This has allowed

us to fluorescently label HIV gp41 with biarsenical dyes. We are using this fluorescent labeling technique to study the molecular details of the mechanism of viral attachment and membrane fusion during the early steps of viral infection.

Student
Mahima Gupta

Major
 Biotechnology

Research Mentor
 Mary Bisson Ph.D

Title
Sodium Transport in Salt Tolerant algae Chara longifolia

Abstract
 Abstract (No more than 200 words): Plants can prevent salt damage by restricting sodium entry into cells (Na⁺ influx) or by exporting Na⁺ which entered (Na⁺ efflux). These fluxes can be distinguished by measuring radioactive ²²Na⁺ isotope movements. In the salt tolerant alga Chara longifolia, most of the Na⁺ which enters the cell is removed by efflux through a Na⁺/H⁺ antiport system. In freshwater-adapted plants, sodium efflux is higher at pH 5 and similar in pH 7 and 9, and is sensitive to amiloride by not Li⁺. Saltwater-adapted C.longifolia had been shown to have higher Na⁺ + efflux than fresh water adapted species, with a more linear dependence on pH and more sensitivity to Li⁺ than amiloride. We salinized a freshwater tank to observe the emergence of these differences with time in salt culture. Although the efflux rate initially fell, counter to expectations, it did increase over time. Efflux did show a more linear relation with pH. Inhibitor sensitivity experiments are on-going. Knowing the time course of development of these efflux properties will aid us in discovering the molecular basis for the changes.

Student
Jennifer Huber 

Major
 Biomedical Sciences

Research Mentor
 Dr. Mouhamed Awayda, Ph.D.

Title
Elucidating the Function of Sodium Channels in the Heart

Abstract
 Our preliminary data revealed that subunits that constitute the epithelial sodium channel (ENaC) are expressed in heart tissue. ENaC is a membrane protein that mediates salt absorption in the kidney therefore it may also mediate sodium absorption in the heart. This may indicate that cells in the heart which sense and respond to changes in blood pressure may also sense and respond to changes of serum sodium.

To test the hypothesis that ENaC expression in the heart is dependent on dietary sodium intake, we measured differences in ENaC subunit expression in the atria and ventricles of the hearts in 6 Dahl, salt sensitive mutant (SS) male rats. These rats were between 30-35 days old. The six rats were given the same type of food but 3 of the rats were given water with a high salt concentration. After 2 weeks their organs were harvested and a Western blot was performed to view the effects high amounts of sodium on ENaC subunit concentration. Preliminary analysis of our data showed that there is expression of all ENaC subunits and additional salt in the diet effects the expression of ENaC. More replicates are needed to be performed to reach statistical significance.

Student
Jason Ma

Major
 Pharmacology & Toxicology

Research Mentor
 Dr. Margarita L. Dubocovich



2012

Title

The MT1 Melatonin Receptor as a Principal Mediator of Methamphetamine-Induced Sensitization in C57BL/6

Abstract

Genetic deletion of both MT1 and MT2 melatonin receptors abrogates the development and expression of locomotor sensitization in melatonin proficient C3H/HeN mice repeatedly pretreated with methamphetamine. However, C57BL/6 mice do not develop or express sensitization using the same METH treatment paradigm. Here we assessed the MT1 melatonin receptors' role in locomotor sensitization using a two METH injection protocol at day and night. Mice were pretreated with either vehicle or METH, then challenged with METH eight days after pretreatment. METH challenge triggered the expression of sensitization in METH-pretreated mice during the daytime. At night, both vehicle- and METH- pretreated mice expressed sensitization to METH challenge. Sensitization was not expressed at either time of day in knockout mice lacking the MT1 receptor. Our results indicate that in C57BL/6 mice, the expression of the MT1 receptor is required for the induction of METH-induced sensitization after a single METH pretreatment. Supported by DA 21870.

Authors: Jason Ma, Antony Hutchinson, Margarita L. Dubocovich

Student

Noopur A. Modi

Major

Biotechnology

Research Mentor

Mr. Dennis Lefler

Title

ELISA for detection of HSV-2 specific IgM antibodies to glycoprotein G(gG-2)

Abstract

Genital herpes is a sexually transmitted disease (STD) caused by the herpes simplex viruses type 1 (HSV-1) or type 2 (HSV-2). Most genital herpes is caused by HSV-2. In United States, 16.2% of people between 14 and 49 years of age have genital HSV-2 infection. HSV-2 is primarily transmitted sexually. Entry of HSV into the host cell involves interactions of several glycoproteins on the surface of the enveloped virus, with receptors on the surface of the host cell. The glycoprotein G(gG-2) purified from HSV-2 infected cells has been reported to be useful for determination of HSV-2 type-specific antibodies using conventional ELISA formats. The studies have also confirmed the specificity of the gG-2 and validated the feasibility of a specific IgM assay. This enhancement could be helpful in making ELISA kits that would distinguish between HSV-1 and HSV-2 on the basis of their unique glycoproteins. The idea is recalled from the paper "Indirect ELISA for the detection of HSV-2 specific IgG and IgM antibodies with glycoprotein G(gG-2)" published in *Journal of Virological Methods*(1992 249-264) in 1991. Random samples from serum panel were chosen for testing at different antigen dilutions across different conjugate dilutions. IFA was run on some suspicious sample after ELISA.

Student

Jessica Page 

Major

Biochemistry/Mathematics

Research Mentor

Dr. Gabriela Popescu

Title

Single-Channel Analysis of $\delta 2$ Receptors

Abstract

Fast excitatory neurotransmission in the brain is mediated by ionotropic glutamate receptors (iGluRs). There are three well studied classes of iGluRs (NMDA, AMPA, and kainate) and one

poorly understood (δ). There are two types of δ receptors, $\delta 1$ and $\delta 2$, which have high sequence similarity to other iGluRs but do not activate upon the binding of glutamate or any known ligand. While it has been shown that $\delta 2$ receptors have important metabotropic functions, little is known about the mechanism leading to channel opening. A naturally occurring mutation in $\delta 2$ known as the "lurcher" mutation results in ataxia and impaired synaptic plasticity in mice. $\delta 2$ -Lurcher (Lc) channels spontaneously open without the binding of a ligand; this mutation is the only established means for investigating $\delta 2$ receptor function. We used recombinant receptors in HEK293 cells, and recorded cell-attached single-channel currents from wild-type and several different mutant receptors. In particular, a single mutation or a reducing condition with DTT breaks an inherent cysteine bond at position C811 and allows for channel activation without the Lc mutation. Not only did we identify novel experimental conditions but we conducted the first single-channel analysis of $\delta 2$ receptors.

Student

Sarah Popadowski

Major

Biochemistry

Research Mentor

Dr. Mark O'Brian

Title

Manganese Dependence in SODM and Pyruvate Kinase

Abstract

Last year I successfully over expressed a pyruvate kinase gene from *B. Japonicum* in *e. coli* cells. Activity assays with pyruvate showed little to no activity unless Manganese was added. Recently, I have been working with a SODM gene from the same model organism. The SODM protein is a super-oxide dismutase, which is responsible for getting rid of harmful reactive oxygen species. There are different classes of SOD enzymes based on the metals they interact with. There

 = Member of Honors College

 = CURCA Funded Project



are Copper-Zinc SOD's, Iron SOD's and Manganese SOD's, and they all have different activities and characteristics. The M indicates that it is likely a Manganese dependent enzyme. After overexpressing the protein in the presence of Manganese, I performed western blots to confirm the presence of a His-tag. After several attempts, I found a method to solubilize and purify my protein by using 8M urea. Now I am in the process of dialyzing my protein so as to metal-ate it put it back in its natural conformation. My goal would be to reconstitute the protein with Manganese to show a metal dependence similar to that of Pyruvate Kinase. After that, I would like to perform additional activity assays.

Student
Kah Teong, Soh \mathcal{H}

Major
 Biotechnology

Research Mentor
 Dr. Paul K. Wallace

Title
Quantitative Assessment of Myeloid Nuclear Differentiation Antigen using Flow Cytometry

Abstract
 Myelodysplastic Syndrome (MDS) is a set of clonal marrow failure disorder that are difficult to diagnose due to the lack of standard diagnostic parameters, admixture of normal bone marrow in MDS sample and large differential diagnosis in MDS. A combination of markers must be used due to the absence of single marker that can reliably distinguish MDS from non-MDS patient. The ultimate goal of this study is to design the best cocktail that could be applied to diagnose the disease with high confidence, sensitivity and specificity. Cell were lysed and permeabilized for both intercellular and intracellular staining and the intensity of the signals were assessed using flow cytometry. A standard protocol based on formaldehyde & saponin (Caltag) and one developed by Chow et al., which based on formaldehyde & Triton X-100 were compared to determine

which methodology provides better permeabilization as it is crucial to our intracellular staining. Chows et al. based methodology was deemed to be superior in permeabilizing cell; both THP1 and U937 cells lines produced positive signals. However, cell lines K562 did not provide enough information, of whether the signals came from intracellular staining, or from the remains of anti-MNDA stain that stayed in the cells.

Student
Elizabeth Spina \mathcal{C}

Major
 Biochemistry & Mathematics

Research Mentor
 Dr. Shermali Gunawardena

Title
Investigating the Role of GSK3-Beta in Axonal Transport

Abstract
 Vital information and signals are transported within the axon for neuronal viability and essential function. Since various critical components are transported down the axon, the axonal transport pathway must be highly controlled or regulated. Here we investigate the role of GSK3-Beta (a serine threonine kinase) in axonal transport. In *Drosophila melanogaster*, mutations of motor proteins such as kinesin and dynein show characteristic axonal transport defects. Mutant crawling larvae show tail flipping or a posterior paralytic phenotype. Additionally, these larval segmental nerves show axonal blockages when stained with a synaptic vesicle marker, cysteine string protein. We found that while 50% reduction of GSK3-Beta alone did not show axonal transport defects, 50% genetic reduction of GSK3-Beta with 50% genetic reduction of kinesin or dynein show axonal defects, indicating that that GSK3-Beta genetically interacts with both motor proteins. Furthermore, we found that GSK3-Beta activity influenced axonal defects and these defects were enhanced by 50% reduction of presenilin

(PS), a gene involved in Alzheimer's disease (AD). Taken together, our results suggest that GSK3-Beta has an essential function in normal motor protein activity and that PS performs an important role in GSK3-Beta mediated axonal transport.

Student
Aashutosh Vihani \mathcal{C}

Major
 Biochemistry

Research Mentor
 Piero Bianco, Ph.D.

Title
Single Molecule Studies of RecBCD

Abstract
 Objective: Breaks in double-stranded DNA (dsDNA) if unrepaired is a lethal event. Breaks can arise from many sources. In eubacteria, dsDNA breaks are restored beginning with the RecBCD family of enzymes. The aim of this study is to eventually determine the effect opposing forces have on RecBCD to understand its chemo-mechanical cycle.

Methods: First, an oligonucleotide with a biotin molecule at its 3' end was phosphorylated. After it is phosphorylated, the oligonucleotide is then ligated onto the λ DNA molecule. In essence, it is now a λ DNA molecule with a biotin molecule at its 3' end. RecBCD is also then biotinylated. By utilizing streptavidin coated microspheres, we have been able to bind biotinylated RecBCD and biotinylated λ DNA. The association of biotin to streptavidin is very strong for a non-covalent interaction.

Results & Future Directions: Thus far, procedures to efficiently biotinylate λ DNA have been developed. By similar methods, biotinylated RecBCD has been attached to a streptavidin coated microsphere. The DNA-bead and enzyme-bead subunits will be then brought together to create a complex. Since calibration of the apparatus has already been done, rates of unwinding relative to an exerted force will be determined next at the single molecule level.



2012

Student
Nadav I. Weinstock

Major
Biological Sciences

Research Mentor
Joan S. Baizer, Ph.D

Title
The cytoarchitecture and neurochemical properties of the human dorsal cochlear nucleus.

Abstract
The dorsal cochlear nucleus (DCN) receives auditory information from the eighth cranial nerve. Its structure and physiology have been extensively studied in nonprimate mammals such as the cat and rodent. Data from rodents suggest that the DCN may play a role in the generation of tinnitus. Tinnitus is the perception of a phantom sound that is persistent and often debilitating. However, there is a problem in extending the findings in the rodent DCN to humans. Classic studies suggest that the structure of the human DCN is quite different from that of rodents. To further investigate the possibility of major species differences in DCN organization, we compared Nissl-stained sections of the DCN in five different species. Additionally, we used immunohistochemical techniques in human tissue to look at the pattern of expression of a number of different proteins including VGLUT2 and VGLUT1. In rodent DCN, expression of VGLUT2 and VGLUT1 work as effective markers to distinguish between axon terminals that provide somatosensory and auditory input. Our results in the human will provide useful data on the structure and inputs of the human DCN and the potential role of the DCN in tinnitus modulation.

Student 
Sharifah Zawani Syed Ahmad Yunus

Major
Biotechnology

Research Mentor
Wilma A. Hofmann, Ph.D

Title
Identification of the Nuclear Localization Signal of Myosin IC Isoform A

Abstract
Myosin IC isoform-A (myoIC-A) is a member of the myosin family of molecular motors that localizes to the nucleus where it is involved in processes such as transcription and chromosome translocation. An important question regarding this myosin is how it enters the nucleus because myoIC-A does not possess a classical nuclear localization signal (NLS). The objective of this study was to identify the signal within myoIC-A which leads to its nuclear localization. To this effect we generated DNA-constructs that code for various parts of myoIC-A fused to EGFP and expressed these in mammalian cells. Analysis of the cellular localization of these constructs by confocal microscopy revealed that myoIC-A contains a bipartite NLS. Specifically, our data show that the NLS is composed of the N-terminal region and one of the three IQ-domains that are located in the neck region of myoIC-A. This finding could have important implications for our understanding of nuclear myosin functions. Myosins are generally regulated through calcium-dependent binding of regulatory light chains to the IQ-domains. Our finding that the NLS is located in one of the IQ domains suggests that the nuclear translocation of myoIC-A might be calcium dependent and regulated by IQ-domain binding proteins.

SCHOOL OF NURSING

Student
Jenna K. Goehle

Major
Nursing

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

Title
Use of Alcohol, Tobacco, and Illegal Drugs in Older Adults with Prescription Opioid Treatment

Abstract
Background: Older adults are frequently prescribed prescription opioids for their chronic pain. Use of substances such as alcohol, tobacco, and illicit drugs in addition prescribed opioids can have very detrimental effects on older adults' health. Researchers found that substance use is a risk factor for prescription opioid misuse.

Purpose: This study aimed to describe the use of alcohol, tobacco, and illegal drugs in older adults with prescription opioid treatment. Design: This study used a cross-sectional design. Participants were recruited from two primary care clinics, one pain management clinic, and two senior apartments in Buffalo area. Instruments used were a self-report on substance use for the previous 30 days and a demographic questionnaire.

Results: Preliminary findings (n=120) indicated that 50% of participants reported alcohol consumption with 15 participants reporting binge drinking and 12 participants reporting heavy drinking. Forty percent of them reported tobacco use, 11% reported marijuana use, and two participants reported cocaine use.

Implications: Our findings indicated that substance use in older adults receiving opioid treatment is a common problem. It is important that health care providers routinely assess substance use to early identify at-risk older adults. It also suggests a need for providing education to reduce substance use.

Student
Megan Klyczek 

Major
Biomedical Sciences and Nursing

Research Mentor
Deborah S. Finnell, DNS, PMHNP-BC, CARN-AP



Title
Patterns Of Alcohol Use And Taking Behaviors Antidepressant Medication

Abstract
 Nonadherence to prescribed antidepressant medication and misuse of alcohol threaten the health and well-being of many Veterans. Providers typically fail to examine these common issues together. Veterans taking antidepressants have poor adherence; more so for those with a substance use disorder. While the amount and pattern of alcohol use vary, existing epidemiologic data indicate that less severe drinking disorders, particularly hazardous alcohol consumption, are common in primary care settings. The purpose of this study was to determine the prevalence of four possible combinations of alcohol use and medication taking behaviors: (1) consuming alcohol and not taking medication, (2) consuming alcohol and taking medication, (3) not consuming alcohol and not taking medication, and (4) not consuming alcohol and taking medication, among Veterans in primary care.

Methods: Veterans (n=20) with a positive screen for depression and reporting alcohol use with an active antidepressant prescription were recruited from primary care settings. The timeline followback method was used to collect self-reported alcohol use and antidepressant medication taking behaviors for 30 days. Descriptive statistics were used to collect data for each of the four combinations.

Student
Shannon O’Leary *H*

Major
 Nursing

Research Mentor
 Janice Cooke Feigenbaum, Ph.D., RN

Title
The Effects of Symptoms of Cancer and Treatment on a Couple’s Expressions of Intimacy within Their Relationship: A Literature Review

Abstract
Purpose: To conduct a review of nursing research on the effects of non-reproductive/sexual cancer and cancer treatment on a couple’s expression of intimacy.

Methods: Three oncology nursing journals with a high impact factor were searched by using the key word of “sexual” to identify articles to review.

Results: While believing sexuality is a significant aspect of health, nurses and patients have difficulties addressing this topic. Partners of patients with cancer have intimacy concerns of their own, but many do not discuss it with anyone. A diagnosis of cancer can either positively or negatively impact the perceived quality of a couple’s sexual relationship.

Conclusion: The literature search demonstrated limited work on this topic. Few studies looked at both patients and their partner, and most of these had addressed patients with breast cancer. Future studies should focus on the effects of non-reproductive/non-sexual cancers, since their impact on intimacy is not well understood in the current body of literature. Research on the changes in intimacy of gay and lesbian couples, as well as non-married couples is also needed. Overall, more research is needed on the impact of cancer and cancer treatment on a couple’s expression of intimacy.

Student
Shante White *H*

Major
 Nursing

Research Mentor
 Dr. Deborah S. Finnell and Dr. Janice C. Feigenbaum

Title
Spirituality and It’s Influence on The Recovery from Alcoholism

Abstract
Aim: It is important for nurses to understand that there is a difference

between religion and spirituality. With this understanding, they are able to provide specific care in all settings for individuals whether they are spiritual, religious, or a combination of the two. This paper is a report of a literature search conducted to examine the difference between religion, and spirituality. This paper also examines the affiliation between spirituality and the rehabilitation program Alcoholics Anonymous (AA). Measures evaluating spirituality, religion, and relations between spirituality and its affect within the program Alcoholics Anonymous rehabilitation program were reviewed. *Results:* Spirituality and religion are commonly used mutually, although many nurses and other health care professionals agree that they two are different. No matter what a person’s spiritual orientation is, individuals gain the same benefits of AA. Despite this, spirituality aides in maintaining and sustaining AA related involvement and practices even after the completion of the program. *Conclusion:* Despite the past research conducted on the differences in spirituality and religion, they are still used interchangeably, which constitutes that more research is needed on the topic. Spirituality does have some influence on sobriety in patients. More literature searches will be conducted on spirituality and AA to further support the connection between spirituality and sobriety.

SCHOOL OF PHARMACY & PHARMACEUTICAL SCIENCES

Student
Peter Bloomingdale

Major
 Pharmaceutical Science

Research Mentor
 Dr. Sathy V. Balu-Iyer

Title
Role of CD40 on the Tolerance Induction of Dendritic Cells



2012

Abstract

Hemophilia A, a blood coagulation disorder, is due to a deficiency in the clotting protein Factor VIII (FVIII). The current standard of care, administering exogenous FVIII, results in the development of neutralizing antibodies. Recent studies have shown that complexing FVIII with phospholipids such as phosphatidylserine (PS) and phosphatidylinositol (PI) reduce the development of these neutralizing antibodies. The FVIII-PS/PI complexes, compared to naïve FVIII, have various immunomodulatory actions such as altering the phenotypic characteristics of dendritic cells (DCs), the cytokine microenvironment, and reducing T-Cell activity. The FVIII-PI complex specifically down-regulates the costimulatory signal CD40, increases tolerogenic cytokines such as Transforming Growth Factor Beta (TGF- β) and IL-10, as well as decreases immunogenic cytokines such as IL-6 and IL-17. The main objective of this study is to determine if the down-regulation of CD40 plays a role in modulating tolerogenic and/or immunogenic cytokine expression as well as the T-Cell response to FVIII.

Student

Daniel Ferguson

Major

Pharmaceutical Sciences

Research Mentor

Dr. Javier Blanco

Title

DNA Sequence Variants in the Carbonyl Reductase Gene (*cbr1*) in 7 Breeds of *Canis Lupus Familiaris*

Abstract

Purpose: An exploratory sequencing analysis of the canine gene encoding carbonyl reductase 1 (CBR1), and search for potential single nucleotide polymorphisms (SNPs). **Methods:** CBR1 amplification from genomic canine DNA samples of seven breeds using custom primers and polymerase

chain reaction (PCR), followed by gene sequencing analysis.

Results: A total of thirteen SNPs were identified in CBR1 and surrounding sequences. Two synonymous SNPs (Exons 1 & 3), seven SNPs specific to the five prime untranslated region (5' - UTR), and four SNPs specific to introns were detected. A ten base pair insertion within the 5'UTR was detected in all breeds excluding Boxers. A common region of deletion spanning between one and 21 base pairs was observed in the 5'UTR of all breeds.

Conclusion: Excluding intra-breed variations and deletions, the protein coding regions of canine CBR1 appear well conserved throughout all breeds.

Student

Weilin Jin

Major

Pharmaceutical Sciences

Research Mentor

Dr. Marilyn Morris

Title

Prediction of Biliary Excretion in Dogs Using Quantitative Structure-Pharmacokinetic Relationship

Abstract

Introduction: Biliary excretion is an important route for drug elimination. However, it is difficult to collect bile fluid in humans due to its limited accessibility. Our goal was to develop a quantitative structure-pharmacokinetic relationship (QSPKR) model to estimate the percentage of dose excreted into the bile (PDb) in dogs.

Methods: PDb data (N=134) for parent compound only in dogs was collected from the literature and randomly divided into training and test sets. Structural descriptors were calculated using SYBYL and QSARis. QSPKR models were derived using stepwise multiple linear regression for the dataset and subsets based on charge: anion, cation/

neutral, and zwitterion compounds in SAS version 9.2.

Results: QSPKR models were developed for the full dataset and the subsets, however, the models were too unstable to predict the PDb, except for the anion subset ($r^2 = 0.786$ and $Q^2 = 0.600$). We further evaluated this model on an external test set, but the model performed poorly ($r^2 = 0.0632$).

Conclusions: QSPKR models were derived for PDb in the dogs. However, the models were not significant except for the anion subset, in contrast to previous QSPKR models in rats and humans.

Student

Jigar Patel

Major

Pharmaceutical Sciences

Research Mentor

Dr. Sathy Balu-Iyer

Title

Characterization of IL-12 molecule when packed in liposomes

Abstract

Distearoyl-phosphatidylcholine (DSPC) and dimyristylphosphatidylglycerol (DMPG) are the lipids that are used to prepare multilamellar liposomes as a delivery source for Interleukin-12 (IL-12). Currently there is no understanding on how IL-12 fits in liposome of DSPC and DMPG. In the present work, we characterized IL-12 molecule when packed in multilamellar liposome. Molecular characterization of IL-12 liposome was done using the effective technique of fluorescence, polarization and general polarization. Different methods were employed to better understand the IL-12 liposomes. Polarization studies detect the phase transition in blank liposomes and further studies analyzed the changes in phase transition after incorporating IL-12 in blank liposomes. Diphenylhexatriene (DPH) is a fluorescence probe used for polarization. General polarization studies detect any changes in membrane with respect to the polarity of bilayer. Polarity



2012

of blank liposomes will be different from that of IL-12 liposomes. This change can be detected with Laurden (Fluorescence Probe) and can be better understood looking at the emission spectra. General polarization and polarization studies help to study the molecule and predict the way it behaves in different environment.

SCHOOL OF PUBLIC HEALTH & HEALTH PROFESSIONS

Student
Christopher Campoli

Major
Exercise Science

Research Mentor
Dan K Ramsey Ph.D.

Title
Vertical Jump Tests: An Insufficient Measure of Power Deficits Among Collegiate Wrestlers

Abstract
Objective: This study examined whether the vertical jump is a sufficient task to determine power deficits in collegiate varsity level wrestlers.

Methods: Six wrestlers underwent Wingate, bench press and vertical jump testing under three conditions; baseline, followed by 2 randomized conditions (fluid and caloric restriction). Subjects performed 7 sets of 3 consecutive counter movement jumps. Vertical height was measured using a Vertec and ground reaction profiles obtained from a force platform. Vertical force data were normalized to body weight, time normalized to take-off phase and ensemble averaged across trials and conditions. Means were compared using Paired T Tests.

Results & Conclusion: Power deficits were evident among the wrestlers after the Wingate test and bench press, as opposed to the vertical jump. Outcome measures including peak vertical force and total impulse, peak power, work, and positive slope of the vertical force profile during take-off were equivalent between conditions, suggesting the vertical jump is not a sufficient measure to assess power deficits among varsity wrestlers. Future

studies may be warranted to investigate the compensatory mechanisms of wrestlers that enable them to maintain jump height despite apparent fatigue.

UNDERGRADUATE ACADEMIES

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.

Students
Marcus Alexander, Edward Hess, Jacob Urmanec, Elizabeth Ward

Research Mentors
Dr. David Fertig, Aron Marvel, Rachel Stern

Title
Role of Language Barriers in Health Care Disparities

Abstract
Many different languages are spoken across the United States, and there is an increasingly large population whose first language is not English. Research shows that there is disparity in health care between those whose first language is English and the limited English proficiency population. Research continues to be conducted on whether this disparity is caused by actual language

barriers in doctor-patient communication or whether it is the result of other reasons including cultural practices of the non-English speaking population. On the local level, two organizations that work to provide services to minimize this language-based communication problem are the International Institute of Buffalo which works with Buffalo's immigrant and refugee population and the Catholic Health System which provides 24 hour medical interpretation services to its patients. Our goal is to analyze methods and practices that have been implemented by these two Buffalo institutions. We hope to determine if the relationship of language barriers to disparity in health care is one of causation or only a correlation and to compare the effectiveness of interpretation, bilingual doctors, and technologies such as mobile translation applications in reducing this barrier to providing effective care.

Students
Samah Asfour, Shontay Barnes, Tazrin Hussain, Anell Vidal

Research Mentors
Dr. David Fertig, Aron Marvel, Rachel Stern

Title
Bacha Bazi: The Effect on Afghanistan

Abstract
Torn by civil war, some in Afghanistan seek social and economic gain through sex-trafficking of Bacha Bazi ("dancing boys"). Boys as young four are forced into slavery by older men for sex and entertainment. Afghan people are aware of the tradition, but there exists a controversy over its legality. We hypothesize that social and economic factors contribute to the continuation of the Bacha Bazi business. Using scholarly journals and statistical databases, we evaluate this hypothesis.



2012

Students

**Kavita Bheir, Gary Iacobucci,
Alessandra Waylon**

Research Mentors

Dr. David Fertig, Aron Marvel, Rachel Stern

Title

The Effects of Organ Procurement Policy on Illegal Organ Trafficking

Abstract

A scarcity of available organs to meet transplant demands has spurred illegal organ trading into a lucrative business. The selling of organs as a commodity has clear ethical, economic, and social ramifications for both donor and recipient. Over time, countries have developed different means of increasing the donor supply, namely through Opt-in, Opt-out, Mandated Choice, and the more controversial prisoner-based policies. Each of these models carries with it ethical concerns. It is hypothesized that implementation of the most effective policy would reduce the amount of organ trafficking. To identify the most efficient method, we selected four countries representative of their respective policies and analyzed the efficacy of their procurement via donor registry archives dating between 1993 and 2010.

Students

**Maryam Ebrahim, Nikita Jain,
Chutian Li, Amog Rajapur**

Research Mentors

Dr. David Fertig, Aron Marvel, Rachel Stern

Title

Effectiveness of Child Sponsorship Programs

Abstract

One effective way of reducing world poverty is through child sponsorship. We are evaluating two child sponsorship programs, Child Fund and World Vision, in an effort to determine the effectiveness of different methods of funding

distribution. We selected Afghanistan as our country for research because 36% of the population lives below the poverty line. We are measuring the amount of financial aid and goods that these two companies collect. Based on this data, we will evaluate and compare the effectiveness of these organizations.

RESEARCH EXPLORATION ACADEMY

The Research Exploration Academy is an inclusive and diverse community of student and faculty scholars that fosters creativity, collaboration, and the development of research skills. Under the direction of Academic Director, Dr. James N. Jensen, Professor, Department of Civil, Structural and Environmental Engineering, students applied research skills to topics in biomedical engineering.

Students

**Samantha T. Bennett, Scott Buck,
Valeria Crnjanski, Jason Anthony
D'Souza, Jacob Kimball, Connor
Leek, Elizabeth Moon, Antonio
Palinkas**

Research Mentor

Dr. James N. Jensen

Title

Human Life on Mars?

Abstract

Humans have been exploring for centuries, but we have barely scratched the exploration of space. This poster will explore whether we have the knowledge and resources in the fields of medicine, geology, and engineering to colonize and survive the barren Martian wasteland. We will present the technology necessary travel to Mars and back safely and efficiently, focusing mostly on the ship's propulsion systems. We will examine the problems that low gravity and radiation may cause in the human body and present solutions. The poster will present the challenges for a self-sufficient living environment for humans on the surface of Mars. It will also assess potential

societal structures of a Martian colony and whether or not we as a species are ready to explore Mars as a species.

Students

**Daniel Calzadilla, Ana Marmolejos,
Sanjot Singh Nijjar, Sharon Yoo**

Research Mentor

Dr. James N. Jensen

Title

UB Late to Class?: An Examination of GPS to Reduce Bus Wait Times

Abstract

The wait times for the University at Buffalo's Stampede buses are very sporadic. To alleviate this problem, we evaluated the implementation of a GPS tracking system. We investigated universities and other organizations that have implemented a tracking system to see how their GOS systems worked and if the tracking system improved waiting times. We will collect data from University at Buffalo's Transportation Office to see when wait times are the longest. Data will be used to draw conclusions on the applicability of a GPS tracking system for buses at the University at Buffalo.

Students

**Lauren Carnevale, Madeline
Grossman, Komall Omrao, Grace
Tan, Irianna Torres**

Research Mentor

Dr. James N. Jensen

Title

Effects of Phthalates on the Endocrine System

Abstract

Phthalates are a family of manmade compounds used in the manufacturing processes of plastics. Because they are a cheap way to increase the viscosity of plastics during manufacturing, people are constantly exposed to these synthetic materials. In addition, phthalates readily leak into the environment due to their



2012

aqueous solubility. Phthalates are believed to cause early onset puberty, which suggests that they interact with the endocrine system. We will summarize previous research on the effects of phthalates on the environment, human growth, and human development.

CIVIC ENGAGEMENT ACADEMY

The Civic Engagement Academy's mission is to create a campus community linked by our interest in being informed, active, and skilled citizens committed to serving the public good. Academies students fulfill this mission through curricular and co-curricular activities that create opportunities for students to find an influential role in their university, local, national, and global communities. As citizens of an urban public university, we support UB's commitment to be an active and contributing community partner. Under the direction of Academic Director, Barbara Bono, Associate Professor of English, students explored how individuals and communities make change, and empower themselves to do so.

Students

Benjamin Bennam, Carley Brindle, Geoff Brown, Shannon Dowling, Christopher Stump

Research Mentor

Dr. Barbara J. Bono, Margaret Konkol

Title

Food Security on Buffalo's West Side

Abstract

In order for a community to be food secure, there must be affordable food that is accessible, fresh, and nutritious. Food must also be reasonably priced and culturally appropriate. Although Buffalo's West Side is a vibrant and growing community, food security represents one of its greatest challenges. Five percent of Erie County's consumers do not have cars and live farther than a 30 minute walk from healthy food sources. Our project analyzes the local

food system and contributes to the development of the Healthy Corner Store Initiative, an Erie county-wide ordinance which would require all convenience stores to stock a certain percentage of fresh healthy food. Working with Buffalo City Councilman David Rivera and his assistant, Sean Mulligan, we mapped local groceries, restaurants, convenience stores, gardens, bodegas, and meat distributors and conducted secret shopper explorations. Our Geocode map visually represents accessibility challenges. At each location we noted food variety and quality as well as the gender, age, and ethnicity of the proprietor and the clientele. We also noted the arrangement of the products within the store. As a capstone, we participated in a workday at the Massachusetts Avenue Project, an urban farm and entrepreneurship project.

Students

Paris Canty, Kaitlin Landolf, Margaret Murray, Dylan Steed

Research Mentor

Dr. Barbara J. Bono, Margaret Konkol

Title

From Burma to Buffalo: Revolution, Refugees, and Renewal

Abstract

Burma is the second-largest country in Southeast Asia, with over 58.8 million people. Since a military take-over in 1962 it has suffered from poverty and human rights abuses. As a result of these hardships, over 3 million Burmese refugees have immigrated to the United States. Every year about 4,000 arrive in New York, 1,000 of whom are sent to Buffalo. Today they comprise nearly 1 percent of Buffalo's overall population. Burmese refugees receive assistance from several organizations, including The International Institute of Buffalo, Journey's End, Catholic Charities, and Jewish Family Services. Our group is acculturating three recently arrived young Burmese refugees through The International Institute's new "Friends and Mentors Program." Each week

we travel to Buffalo's Riverside neighborhood to introduce these young men to features of everyday American life like shopping, food preparation, public transit, finances, and services and recreation. In the process, we learn about them and their culture. As the capstone to our two-month effort we will also be helping Buffalo's CEPA gallery mount its spring show of the photography of Law Eh Soe, an older Burmese refugee who documented the 2007 "Saffron Revolution," led by Buddhist monks, which has produced various promising governmental reforms.



Student presenters were nominated by their Deans to participate in today's Celebration of Student 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 The University at Buffalo'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.