College of Arts & Sciences

Students
Sundas Aziz, John Traversone

Major
Biomedical Sciences

Research Mentor
Mary Bissom

Title
Kinetics of Cadmium transport in Chara australis

Abstract
Cadmium (Cd): a toxic heavy metal; occurs in the environment from weathering of Cd-containing sediment as well as agricultural and industrial actions. The large fresh water alga; Chara australis have the ability to take up Cd from its wet environment; which can then be harvested; suggesting a potential for Chara in phytoremediation. Phytoremediation is the process of using living green plants for the containment or removal of pollutants such as Cd. Isolated Chara cells are exposed to different concentrations of Cd; including radioactive 109Cd; and accumulation of radioactivity is monitored with a gamma radiation counter after a brief incubation. This allows us to determine the mechanism of uptake. We propose that Cd enters the cells using zinc transporters. Thus; the experiments will be repeated in the presence of zinc; to see if it interferes with the uptake of Cd (competitive inhibition).

Students

Major
Biography and Psychology

Research Mentor
Elia Eiden

Title
Social Skills Predict Depression in a High Risk; Low Income Sample

Abstract
Social skills in kindergarten accounted for 4% of the variance in depression. These results highlight the importance of family routine for the development of social skills. Family unpredictability may be particularly prevalent in families living with poverty; and may lead to cascading risk processes for children’s social-emotional development.

Students

Major
Computer Science

Research Mentor
Dr. Kush Bhardwaj

Title
21st Century Slave

Abstract
21st Century Slave is a literary novel based on the six-year incarceration of an innocent man whom I met in Buffalo; as told by a disaffected millennial narrator. The novel is based on my own experiences and the experiences of the falsely convicted. My presentation would cover facts regarding the justice system; the psychological helplessness of the current generation; the history of existentialism; Christian Hermeticism; and other academic topics that are subtly woven throughout the narrative and each worthy of a speech in their own right. The novel was an independent product; published due to similar orientations within each sample. It is yours to judge whether or not the hypothesis of alignment by pure shear due to similar orientations within each sample.

Students

Major
Psychology

Research Mentor
Richard Burke, Randi Henricy

Title
Shear Strain Determination of the Orientation of Microlites in Volcano Conduits

Abstract
Microlites; acicular microscopic crystals found in glassy igneous rocks; have been used as an indicator of the shear strains which modify rheological lava as it exits the volcano conduit during lava flow. The object of this study is to investigate how the preferred orientations of microlites in samples of obsidian from explosive eruptions may allow the assessment of shear strain during formation. Although possible that extended exposure to simple shear in the conduit could eventually align microlites; we hypothesize that microlites are subjected to pure shear in the conduit of the volcano; instead to explain the consistent microlitic alignment. To test our hypothesis; samples of obsidian from tephras of the Mono craters were cut into thin sections on X; Y; Z axes and observed under a microscope. The orientations and standard deviations of the microlites were recorded and compared and found to support the hypothesis of alignment by pure shear due to similar orientations within each sample.

Students

Major
Geological Sciences

Research Mentor
Marco Burvik

Title
Removal in Electrodermal Activity

Abstract
Removal in Electrodermal Activity (EDA) has long been a tool for psychologists
and psychophysicists to monitor physiological measures of stress; cognition; physical arousal; and as a predictive tool for epileptic seizures. Wearable bio-sensor technology has recently been allowed for long-term; ambulatory measurement of EDA with non-invasive devices. These measures; however; exhibit large amounts of individual variability and high sensitivity to data artifacts from common movements. In this study; we collect baseline skin conductance readings during controlled conditions while re-creating common; artifact-producing events including applying pressure; near the wrist; applying pressure to a metal electrode contact; and arm movements. We then review and compare several methods of filtering and processing the data for these disruptions including manual removal of artifacts; low- and high-pass filtering; and algorithmic removal of inconsistencies. Compared to previous methods of EDA analysis; we hope that these methods will allow for removal of particular artifacts regardless of variation in baseline and atypical sympathetic arousal.

Student C
Nicole Cane

Major
Global Gender Studies

Research Mentor
Maria Segol

Title
Gender; Oppression; and Peace in the Home: A Study of the Application of Shalom Bayit in Contemporary Jewish Communities

Abstract
In modern Jewish communities; there is a major issue of women feeling forced to stay within abusve marriages. We will explore how the Jewish understanding concept of Shalom Bayit (peace in the home) has come to be gendered within these few communities; so that the responsibility for keeping the peace in the home involves women's submission. In the end; it shapes women's roles in marriage and society. In the course of my research; I examine gender roles in text forms in gender roles within marriage and within the conception of peace in the home. I then collected and disseminated a survey assessing the concepts and implementations of Shalom Bayit in contemporary Jewish community. In this presentation; I will present my analysis of the results. The purpose of this research is to assist in thinking about educational initiatives and programs being created to end to the suppression of women's rights within sheltered Jewish communities.

Student C
Xanthe Calhoun

Major
Biology

Research Mentor
Omer Gokcumen

Title
Evolutionary origin and functional impact of the GHR deletion

Abstract
Studies have shown hundreds of genetic variants among humans being associated with; height; and overall body size. The common deletion of the third coding exon of the growth hormone receptor gene (GHR) is one of them. Though the evolutionary origin of this deletion and its exact functional impact are not known; it has been associated with increased response to growth hormone treatment in height; and weight. We created a transgenic mouse model to study the impact of the deletion on organo-metabolic phenotypes; transcription levels; and protein activity. Using polymerase chain reaction based approaches; we explored the variation of the growth hormone receptor gene at the transcriptional level. We observed that homozygous recessive growth hormone receptor mice grew more slowly early on as compared to their wildtype counterparts. Our model has allowed us to explore the functional and evolutionary impact of the deletion affecting growth hormone receptor in humans.

Student C
McKenzie Cantlon

Major
Psychology; Legal Studies; Political Science

Research Mentor
Dr. Jamie M. Ostrov

Title
Relational and Physical Victimization and its Predictions on Peer Relationships

Abstract
There has been limited research into the effect of victimization on play partners and peer acceptance/rejection for children in early childhood. The objective of this study was to examine the relationship between the victimization subtypes and peer relationship variables cross-sectionally using three hierarchical regressions. Results showed that physical victimization was positively associated with play partners and negatively associated with peer rejection and peer acceptance. Relational victimization was negatively associated with peer acceptance.

Student C
Roy Cineus

Major
Chemistry

Research Mentor
Christopher Bond

Title
Potential CEST Contrast Agent for MRI Applications

Abstract
There’s a new class of compounds with promise for magnetic resonance imaging (MRI) contrast. The class is called transition-metal-ion-based paramagnetic chemical exchange saturation transfer (paraCEST). This new class of contrast agents is being pursed more heavily compared to previous contrast agents because they are deemed safer. MRI is a technique used to map water protons. Thus paraCEST agents are synthesized and used to study the mapping of water proton. The purpose of this project is to synthesize a paraCEST contrast agent that will be viable in enhancing MRI contrast.

The focus of my research is using 1-oxa-4;7-diazacyclononane; reacted to synthesize a paraCEST contrast agent to enhance MRI. The purpose of this project is to synthesize a paraCEST contrast agent that will be viable in enhancing MRI contrast. The focus of my research is using 1-oxa-4;7-diazacyclononane; reacted to synthesize a paraCEST contrast agent to enhance MRI.

Student C
Alexander D’Arrigo

Major
Chemistry

Research Mentor
David Lacy

Title
Zinc- and Cobalt-Catalyzed Water Oxidation

Abstract
Water oxidation is one of the core processes of photosynthesis. This natural reaction has important implications for energy; and a synthetic structure was made to investigate this interaction. Specifically; a series of tris-p-substituted carbamoyl methyl ligands were synthesized in order to explore the formation of dioxygen. The p-substitution electronically tunes the ligand; which is intended to displace influence properties of a ligated metal ion. Therefore; metal complexes will be prepared by metalation with zinc(II) acetate or cobalt(II) acetate. After characterization of the metal complexes; reactivity with various organic superoxides will be probed. The cobalt(II) species specifically will be oxidized to cobalt(III) to react with the superoxide and reduce the metal center to cobalt(II). This will convert the superoxide into oxygen. The reduction will be monitored via spectroscopic and physical methods (UV-Vis; GC; etc.) to evaluate rate with the electronically tuned ligands.

Student C
Hui Duan

Major
Mathematics

Research Mentor
Leonard Simms

Title
Exploring the Factor Structure of An Inclusive Set of Common Language Person Descriptors

Abstract
Critics of the Five Factor Model of personality (FFM) have argued that the model was developed based on a line of research that focused exclusively on personality trait terms. Previous research has been limited to a wider range of terms in solutions containing more than five factors. The present study explored the factor structure of the Common Language Word List (CL-519) (St. Clair Calabrese; & Rodnick; 2009; an inclusive list of personality descriptors. Participants provided self- and informant-ratings for the CL-519 and a few other established measures of the Big Five and the Big Seven factor models of personality. After factor analyzing the self- and informant-ratings on the CL-519; the best-fitting solution was retained. This solution included a range of psychological; physical; and evaluative factors. The validity of the obtained
Waterfall Plume Dynamics: Niagara Falls

Abstract
Waterfalls generate curvilinear or plumes of water where descending water deaccelerates rapidly in the plunge pool or rocks at the base. The goal of this study is to investigate the factors that influence generation and changes of mist plumes and curtains at waterfalls with a case study on Niagara Falls. The mist curtain at Niagara Falls shows great variation in characteristics: sometimes propagating down upstream like a gravity flow, but other times rising nearly vertically: reaching heights up to 1km. We hypothesize that this change in plume and curtain geometry is due to temperature variation between mist and the surrounding air; resulting in either a buoyant plume when the mist is significantly warmer than the air; or sinking of the aerosolized water/air mixture; when the mist is colder than the air. To test this hypothesis; infrared imagery and detailed meteorological data were taken at both the Hornsby and American Falls; at a range of temperature differences between the mist and the surrounding air. The data are consistent with the hypothesis: showing warmer water aerosol driving plume rise; and colder water aerosol driving downstream currents.

Students
Antonia Figuereido
Major
Biology and Chemistry
Research Mentor
Dr. Peter Thanos
Title
FABPs/7 Deficiency Decreases Ethanol Consumption in Mice
Abstract
The endocannabinoid (ECB) system is involved in a wide range of diseases including alcoholism. ECBs are inhibitory retrograde messengers that bind to the cannabinoid type 1 (CB1) receptor. Recently ECB signaling has been investigated and inhibition of fatty acid amide hydrolase (FAAH); which degrades the ECB anandamide (AEA); has been shown to significantly increase ethanol consumption. Similarly; fatty acid binding proteins; which transport AEA for degradation; increase AEA levels. Our objective was to examine the effect of FAAH in a paradigm where male and female mice underwent the same drinking two-bottle choice paradigm. In a second experiment; using SBFI26 throughout a restricted-access paradigm; both male and female mice received vehicle; 5; 20; or 40mg/kg SBFI26. In this study; we hypothesized that FAAH inhibition; especially in females; would significantly increase drinking levels. Our results support this hypothesis; with females showing a significantly greater increase in drinking levels than males.

Students
Kari Wilkins
Major
History and Political Science
Research Mentor
Carole Emberton
Title
Neglecting our Urban Environments: How the Highways Reshaped our Cities
Abstract
Focused locally on the Kensington Expressway; my presentation hopes to illustrate how the urban highway has altered the landscape of the city. Specifically; I seek to address how the Kensington Expressway displaced hundreds of families; uprooted communities; and segregated our communities more profoundly than ever before. Through the use of historical photographs; newspaper reports; and statistical facts; the urban highway construction will be presented through quantitative data; as well as personal experiences and local opinions.

Students
Allison Greco
Major
Physics
Research Mentor
Assistant Professor Salvatore Rappoccio
Title
Gluon Jet Mass Measurement
Abstract
We present a measurement using proton-proton collision data with a center-of-mass energy of 1 TeV from the Compact Muon Solenoid experiment at the Large Hadron Collider. We measured the differential jet production cross section as a function of the jet mass and transverse momentum in gluon jets produced in three-jet events for the purpose of studying the quantum chromodynamic evolution of gluons. A jet grooming algorithm known as Soft Drop is used to remove soft; near-partonographic portions of the jet. The ungrossed and groomed data is presented alongside simulated predictions from multiple Monte Carlo event generators. First-principles theoretical calculations of the jetted gluon mass are also compared to the data for only the second time ever at a hadron collider; the first time being our previous measurement of the differential jet production cross section of dijet events.

Student
Walter Hakala
Major
Asian Studies and Philosophy
Research Mentor
Jennifer K. Hacket
Title
Translating Religion Across Asia
Abstract
I investigate the process of translation and the cultural impact of religious translation and the ways in which religions are translated by the Chinese scholar Lü Zhi (ca. 1670-1724) as a flashpoint for the theory of religious translations. I subject the Neo-Confucian Chinese terms used to analyze this process within the context of the longer meanings of the terms.

Students
Dennis Fricke
Major
Psychology
Research Mentor
Dr. Thanos
Title
Changes in brain glucose metabolism from oral methylphenidate treatment in rats
Abstract
Methylphenidate (MP) is a psychostimulant prescribed for the treatment of Attention Deficit Hyperactivity Disorder. Using an 8-hour limited-access drinking paradigm; male Sprague-Dawley rats were given MP diluted in drinking bottles to mimic clinical drug delivery at low and high doses. Mice were housed using a glucose analog. [3H] fluorodeoxyglucose (FDG) were coregistered with thirty-three weeks of MP treatment to assess changes in brain glucose metabolism (BGluM). Results show that HD treated rats had increased BGluM in the areas associated with spatial learning and memory; motor control; reward; working memory and balance; compared with controls. LD treated rats had increased BGluM in areas associated with olfaction; breathing; spatial learning and memory; motor control; working memory and reward. HD treated rats also had decreased BGluM in the areas associated with reward expectation; sensory perception; movement planning; preference learning; memory processing; anxiety; respiratory control and motor task control. Methylphenidate has a significant effect on BGluM after chronic treatment.

Student
Lisa Gagnon
Major
English and Linguistics
Research Mentor
Barbara Bono
Title
Soothing Our Savage Inequalities: Nonprofit Arts Education in Buffalo
Abstract
Even as cutbacks in arts programming disproportionately impact low-income and minority students; research is just scratching the surface of the cognitive and social benefits of participating in the arts. Rather than focusing on the failings of the education system; however; this project tells the stories of three successful Buffett arts nonprofits with whom I have worked. Just Buffalo Literacy and Services provides free writing workshops taught by local artists; Buffalo String Works teaches violin and cello to West Side refugees; and Shakespeare in the Parks involves underprivileged teenagers to perform theater. My project examines how creative writing; music and theater uniquely affect the brain and learning; as well as the benefits arts education has had on underserved populations from Buffalo; NY (mainly LGBTI) to refugee to African-American students. Finally; based on interviews with program organizers that suggest how to fill in gaps of accessibility and representation in the Buffalo arts community.

Students
Patricia Cannon; Shane Porter; Victoria Rance
Major
Geological Sciences
Research Mentor
Carole Emberton
Title
Extensive Volcanotectonics: Long Valley Volcanic Region; California
Abstract
The purpose of this study is to develop a better understanding about the geological setting of the eastern edge of the Sierra Nevada range. Since the May 25th and 27th; 1980; earthquakes; Long Valley Caldera and the surrounding area have been under intense investigation and monitoring. The young seismic; geochemical; and volcanic features within the region poses a significant hazard to the high alpine communities that are located in Mono and Inyo County. By using sand table analogue experiments; remote sensing data; and previous geologic investigation; our research group was able to generate a model for the active volcanic tectonics processes and features. The results of our studies of active faulting are consistent with a model of oblique slip extension on NW trending range front and basin crustal faults with magmatism occurring within the active system where more deep seated processes generate partial melt.

Student
Russel Galbaut
Major
Applied Mathematics
Research Mentor
Brian Spencer
Title
Anticipation Effect and its Case Study: Payne-Whitham Traffic Model with Driver’s Anticipation Effect and its Case Study on Interstate 5 in California
Abstract
We consider the notion of driver anticipation behavior in a microscopic traffic density model by analyzing the “anticipation effect” in the Payne-Whitham traffic equations. The equations are solved analytically to find how driver behavior affects traffic flow. Further; a case study on Interstate 5 in California is performed to compare the model prediction of traffic velocity and density with real data. An error analysis is applied to determine the accuracy of the simulation in different times of day and different numbers of lanes. The main analysis enables the determination of the estimated range of successful model in California highway traffic under different conditions. These results provide a guideline for the practical use for the anticpation rate in simulations using the Payne-Whitham traffic model.
Abstract
Axonal transport defect is thought to play an early role in the progression of neurodegenerative diseases such as Alzheimer’s and Huntington’s disease. In both of these diseases axonal blockages and neuronal cell death in seen; suggesting that disruption of axonal transport may activate apoptotic pathways. We tested the hypothesis that axonal transport defect activates an apoptotic pathway by an increase in cellular stress. We predict that expression of PI3K should rescue neuronal cell death and axonal transport defects (using the TUNEL assay); we found that overexpression of constitutively active PI3K rescues Huntingtin induced neuronal cell death phenotypes; but has no effect on Huntington aggregation within larval brains. We also found that PI3K can rescue external transport defects induced by expression of HTT with expanded polyQ repeats. Taken together our observations suggest that the PI3K pathway plays an important role during neurodegeneration and that excess PI3K could increase cell death but has no effect on axonal transport defects.

Student: Madeline Harvey
Major: Biological Sciences/Dentistry
Research Mentor: Robert E. Baier
Title: The Role of PI3K in Stress Mediated Axonal Transport Defects and Neuronal Cell Death

Students: Christopher Hemburger, Austin Quinn, Zoe Vaughn
Major: Chemistry
Research Mentor: Joseph Gardella
Title: The Application of C-Hydroxysulfate Methacrylate) HEMA hydrogel for wound healing

Abstract
Chronic wound care has been gaining momentum due to drug delivery with the use of growth factors. Polymers such as Keratinocyte Growth Factor; KGF; leads to wound healing in the epithelium cells; and also promotes wound closure. Hydrogels; water swollen structures composed mainly of hydrophilic polymers; serve as a vehicle that delivers the desired substance into the exact location needed for wound healing. Hydrogels aquagels that are able to accommodate various therapeutic factors. 2-Hydroxysulfate Methacrylate; HEMA; hydrogel is chiral because of its ability to achieve different characteristics without significant change to the polymer. Through swelling of HEMA and perfluoroalkylcarboxylic acid; PFPE; a cross linker; it was proven that HEMA holds up to 60% water by weight. HEMA also; has the ability to uptake KGF; proven through the results of the controlled release study. Knowledge that KGF is up taken 60% was further proved by fluorescence and TOP SIMS.

Student: C. Glennon, Garlenys Quezada
Major: Biological Sciences
Research Mentor: Shundali Gunawardena
Title: Huntingtin (HTT) and Rab7 are present on autophagosomes and lysosomes but are not on phagosomes during autophagy

Abstract
Autophagy is a multistep process. The phagophore wraps around cellular waste forming an autophagophore. Late endosomes fuse with the autophagosome forming an lysosome. Phagosomes fuse with the amphisomes to form autolysosomes. Previously; our lab found that HTT and Rab7 proteins are in HD and Rab7 move together on the same axis within the axon. Reduction of HTT disrupted the retrograde mobility of Rab7. While a role for HTT has been proposed in autophagy; which stage HTT is involved in is unknown. Rab7 is known on late endosomes and is involved in amphotrophic vesicles. We hypothesized that HTT and Rab7 are functionally distinct during autophagy and during the axonal transport of autophagosomes. To test this we examined the localization of HTT and Rab7 during the different stages of autophagy using ATG8 (phagosome); synaptosomal17 (autophagosome); and LAMP (lysosomes/autolysosomes). We found that HTT and Rab7 are both functionally distinct during the fusing of lysosomes with autophagosomes in order to create the autolysosome.

Student: C. Glennon, Garlenys Quezada
Major: Biological Sciences
Research Mentor: Shundali Gunawardena
Title: Quantityizing the Urban and Rural Nutrient Fluxes to Lake Erie Using a Paired Watershed Approach

Abstract
Excess nutrients have a detrimental impact on the Lake Erie; specifically nitrates and phosphates; which lead to the growth of toxic algae blooms. Algae blooms have negatively impacted Lake Erie; which is the main sources of drinking water for many Great Lakes communities. The objective of this research is to quantify surface water nutrient fluxes to the eastern basin of Lake Erie using a paired watershed approach. Bi-weekly analysis of three local streams; one large rural; one small rural; and one urban; were conducted during the 2015-2016 winter to summer transition. This allowed for the quantification of seasonal snow melt and its effects on nutrient flux. This was then compared to the seasonal water samples collected during the summer of 2015. Stream flow measurements and a rating curve; which was incorporated into the hydrologic model; was used during the first hour of actual data (09:00-10:00) and 10mg/kg (LD) or 60mg/kg (HD) were used for remaining seven hours (1000-1700). Immediately following a 3-month period of treatment; half of the rats were sacrificed and the remaining half went through an additional 4-weeks abstinence period before they were sacrificed. In vitro autoradiography was carried out with [3H]MK801 to examine NMDA receptor expression in the brain. Immediately following treatment; the HD MP group showed decreased expression in [3H]MK-801 binding compared to the water group in the prefrontal cortex (30.3%); visual (31.3%); and amygdala (34.1%) and hippocampus with expression equal to that of the MK-810 group. Between the LD and HD groups were found in various subcortical and subcortical regions. These effects were short-lived; as no differences between treatment groups were seen following 4 weeks of abstinence. The results of the current study demonstrate the powerful but reversible effects of long-term MP use on the glutamatergic system in the brain.

Student: Khadijatu Jalloh
Major: Studies in International and Social Psychology
Research Mentor: Panayotis Thanos
Title: The Effects of Chronic Methylphenidate on [3H]MK-801 Binding

Abstract
Attention deficit hyperactivity disorder (ADHD) is the most common neurodevelopmental disorder affecting approximately 11% of children in the US. Methylphenidate (MP; Ritalin) is a widely used medication to treat children with ADHD; however; long-term effects of MP treatment during adolescence is poorly characterized in the literature. The aim of this study is to determine the effects of chronic exposure to MP on the NMDA glutamate receptor. To do this; we employed a previously established drinking paradigm that has been shown to deliver MP doses similar to those seen in patients treated for ADHD (Thanos et al. 2015). Briefly; Sprague-Dawley rats were divided into three treatment groups with voluntary access to either low dose (LD) MP; high dose (HD) MP; or control group. The rats were then allowed to drink their assigned solution for a period of 90 days. This resulted in MP consumption of 60 mg/kg; which is used for the treatment of ADHD. After treatment; rats were sacrificed and the brains were obtained. In vitro autoradiography was carried out with [3H]MK801 to examine NMDA receptor expression in the brain. Immediately following treatment; the HD MP group showed decreased expression in [3H]MK-801 binding compared to the water group in the prefrontal cortex (30.3%); visual (31.3%); and amygdala (34.1%) and hippocampus with expression equal to that of the MK-810 group. Between the LD and HD groups were found in various subcortical and subcortical regions. These effects were short-lived; as no differences between treatment groups were seen following 4 weeks of abstinence. The results of the current study demonstrate the powerful but reversible effects of long-term MP use on the glutamatergic system in the brain.

Student: Robby R. Johnson
Major: Geoscience
Research Mentor: Motherlow
Title: Qualifying Root Distribution and Grain Size Analysis in Wetland Communities with Implications for Root Water Uptake

Abstract
Exploring the relationship between root density distribution; grain size analysis and volumetric water content can help constrain root water uptake. These results support efforts to detail nutrient fluxes within plant communities. To investigate this; we quantified root density distribution; grain size; and volumetric water content in six distinct plant communities throughout the growing season. Field sampling and monitoring was conducted during a 202 m plot at Iroquois National Wildlife Refuge in Bismarck; NY. This typically glaciated site was an ideal setting for this research because of the heterogeneous near-surface geology typical of the Great Lakes Basin. In each plant community; soil cores were collected throughout the growing season down to a maximum rooting depth; which was measured between 9-15 cm using a 15 cm interval soil auger. Roots were washed from the samples; then dried and weighed according to standard methods to determine root density by depth. Soil moisture probes were installed in these communities at depths of 15; 30; and 60 cm to continuously monitor volumetric water content. Of these six plant life communities; the grassland variety showed to have the greatest root density — specifically at the depth of 0-15 cm — and largest volumetric water content. The results presented here can help to...
improve the root water uptake function in ecolodology models that forecast how plant communities may be affected by a changing climate.

**Student:** Stacy Johnson  
**Major:** Pharmacology and Toxicology  
**Research Mentor:** Scott Doyle  
**Title:** Macroscopic Anatomy at Microscopic Scale: Registration of Serial Sections of Histopathology for 3D Analysis of Biological Structures

**Abstract**  
In this research, we investigate the problem of reconstructing 3D models of anatomical structure using 2D serial cross sections of histopathology. Biological structures are inherently 3D, and analysis of 3D morphology yields valuable insight into both normal and diseased states. However, native 3D microscopy (e.g., confocal; multi-photon) is expensive and high-resolution images are only possible at a limited specimen depth. High-resolution visualization is routinely done using 2D microscopy sections that lose inherent 3D structure. To overcome these limitations, we aim to combine the resolution of 2D microscopy with the structure of biological anatomy by registering stacks of serial histological sections to reconstruct the true architecture. We develop our methodology to the problem of modeling microvessels located in the vagina and bladder at the trigone region. Our goal is to understand the microvascular architecture to assist in developing treatments for recurrent urinary tract infections.

**Student:** Brandon Kosinski  
**Major:** Psychology  
**Research Mentor:** Robert Ciesla  
**Title:** The Role of Negative Cognitive Content and Rumination in Autobiographical Memory Deficits; A Cognitive Catalyst Model

**Abstract**  
The cognitive catalyst model suggests that the presence of low self-esteem (a proxy for negative cognitive content) strengthens the association between rumination and depressive symptomatology (Ciesla & Roberts; 2002; Ciesla & Roberts; 2007; Robinson & Alloy; 2003). Rumination and negative cognitive content have also been implicated in overgeneral autobiographical memory (Williams; 2005). The present study tested the moderating effect of negative cognitive content on the association between rumination and autobiographical memory specificity. In addition to recall of specific memories, we examined the amount of detail within specific memories. We predict that self-esteem will moderate the relationship between rumination and: 1) depressive symptomatology; 2) memory specificity; and 3) memory detail. Participants completed a self-report battery before writing responses to an autobiographical cueing procedure (2 positive; 2 negative; 1 neutral). This study will provide data investigating if the cognitive catalyst model generalizes to depressive correlates involving autobiographical memory specificity and detail.

**Students:** Quinn Lachter, Shane Murdock, Nate Noworyta, Waylon Wilson  
**Major:** Media Study  
**Research Mentor:** Dave Pape  
**Title:** "Pirate's Code" Game

**Abstract**  
Pirate's Code is a project focused on using both digital and analog components in order to create an immersive multiplayer experience. These two environments are designed to work off each other. The tablet app elements of the game board create a closed digital system whereas the game board app promotes interpersonal face to face communication as they navigate the game board and perform tasks. The development of the digital interface provides a multimedia experience using sound design and animation that would immerse the player into the game world similar to how a modern video game or film would. Thus, combining both an analog game board with an interactive digital interface: what would be a simple board game is capable of utilizing a diverse set of media components from different fields which all come together in this project to create a traditional tabletop experience with an immersive cinematic flare.

**Student:** Edan Lavan  
**Major:** Biological Sciences  
**Research Mentor:** Dr. M. Garrick  
**Title:** How does the regulatory Hepcidin affect iron trafficking in a model cell system representing the kidney?

**Abstract**  
The main goal is to discover how both the metal importer Divalent Metal Transporter 1 (DMT1) and the opposite iron exporter, Ferroportin (FPN), respond to a regulator Hepcidin (Hepc). In the renal tubules of the kidney, Hepc gets filtered out of the blood in the kidney along with other small molecules. It is either taken up and degraded in the tubule or exits the body intact in the urine. If Hepc is absent or absent from the tubule, the transporter will experience an iron overload. The expected result is that Hepc transporters are present in kidney cells and help recover filtered iron from the renal filtrate as they are responsive to Hepc. What I intend to try to gain from my material, which requires iron regulation in more detail inside kidney cells, is to find if FPN not DMT1 but induces FPN and DMT1 turnover within kidney cells.

**Student:** Phuong Q. Le  
**Major:** Psychology & Social Sciences Interdisciplinary  
**Research Mentor:** Dr. Mark D. Seery  
**Title:** Testing the effects of awe on individual goal pursuit: A psychophysiological approach

**Abstract**  
We used immunohistochemistry and Western blot to evaluate the expression of GABA-A receptor sub-types in control rats and 5 chronically stressed rats. We compared our results for control and experimental groups to confirm chronic restraint was inducing stress.

**Students:** Alassane Mballo  
**Major:** Biological Sciences  
**Research Mentor:** Dr. Richard Salvi  
**Title:** Effect of Chronic Stress on GABA-mediated inhibition in auditory cortex

**Abstract**  
Chronic stress has been implicated in the phantom sound of tinnitus; a ringing, hissing or buzzing sensation. Tinnitus; sometimes a debilitating condition is hypothesized to be caused by the loss of GABA (GABAergic inhibition leading to spontaneous hyperactivity within the central auditory system). Since tinnitus is often linked to chronic stress; we hypothesized that chronic stress would result in a decrease of GAD67, which is involved in synthesizing GABA, in the auditory cortex.

**Student:** Matthew Marion  
**Major:** Cognitive Science  
**Research Mentor:** Dr. Peter Thanos  
**Title:** Western blot analysis showed that GAD67 expression was significantly reduced in the auditory cortex of chronically stressed rats. Immunohistochemistry and Western blot studies are currently underway to determine GAD67 expression in specific layers of the auditory cortex.
The Endocannabinoid System (ECS) constitutes a regulatory system, located throughout the central and peripheral nervous systems and their natural lipid ligands known as endocannabinoids. Genetic and pharmacological manipulation of ECS signaling has previously been shown to have effects on pain perception, inflammation; anxiety; depression and drug abuse. Fatty acid binding proteins (FABPs) are intracellular transporters of endocannabinoids and are involved in their breakdown via transport to organelles; as well as in combating pathologic processes; including fungal infection. We identified an aspect of fungal growth; Bud6 and Pea2. We are currently interested in discovering if cells deficient in the sucrose metabolic enzyme invertase (a metabolic enzyme that is secreted and shared by closely related cells) are aggregate deficient. Understanding the mechanisms of cooperation of aggregates will provide evolutionary insights into this fundamental process. Our results may have benefits in industrial processes involving fungi; as well as in combating parasitic fungi.

Major Psychology
Research Mentor Haeni Nam
Title You Have a Friend in Me: The Role of Social Connections in Improving Women’s Math Outcomes

Abstract
Despite making advancements in society; women are still disproportionately outnumbered in traditionally male-dominated STEM fields. Forming social connections may be particularly beneficial in mitigating negative effects that women in STEM may experience. The present research examines how forming social connections in math may improve women’s math outcomes; such as self-efficacy; social support; and attitudes. We created measures of descriptive norms and injunctive norms about MPS use; and personal math use. Building on work of Califini et al. (1990) we created measures of descriptive norms and injunctive norms about MPS use (DN-M; IN-M). Descriptive norms assessed participants’ beliefs about how common MPS use is among typical males and females. Injunctive norms assessed participants’ beliefs about typical male or female acceptance of a friend using MPS. We hypothesized an indirect effect from DN-M; IN-M to marijuana use via MPS use. Using a multi-group path analysis; we also explored gender differences in our conceptual model (i.e. DN-M; IN-M to MPS use to Marijuana use). Descriptive statistics showed that female participants reported more marijuana use and higher IN-M; while males reported greater MPS use and higher DN-M. For males; there was a significant indirect effect from DN-M to marijuana use via MPS use. In contrast; females had a significant indirect effect from IN-M to marijuana use via MPS use.

Title Singing Production and Musical Perception: a Closer Look

Abstract
An interesting mode of music making is singing; and the simplest form consists of vocal imitation of pitches. Despite the ubiquity of this behavior; many people fail to match imitated pitches most of the time. Because singing is a complex behavior; involving many processes; it is not clear how much perceptual or semantic knowledge contributes to singing accuracy. We address the relationship between semantic knowledge of sounds and factors using three leading online tests of musical processing. A measure of imitative singing accuracy from the Seattle Singing Accuracy Protocol (SSAP); a test of melody perception based on the Montreal Battery of the Evaluation of Amusia (MBAEA) are measures of their applicability to duration perception. A simple pitch discrimination task. A group of 100 college students were randomly sampled from students taking Psychology courses at the University at Buffalo. The State University of New York. We tested the following hypotheses: constraints being the lack of any bearing deficits or vocal motor disorder.

Major Psychology
Research Mentor Wolfgang Ellermeier
Title Perception: a Closer Look

Abstract
An interesting mode of music making is singing; and the simplest form consists of vocal imitation of pitches. Despite the ubiquity of this behavior; many people fail to match imitated pitches most of the time. Because singing is a complex behavior; involving many processes; it is not clear how much perceptual or semantic knowledge contributes to singing accuracy. We address the relationship between semantic knowledge of sounds and factors using three leading online tests of musical processing. A measure of imitative singing accuracy from the Seattle Singing Accuracy Protocol (SSAP); a test of melody perception based on the Montreal Battery of the Evaluation of Amusia (MBAEA) are measures of their applicability to duration perception. A simple pitch discrimination task. A group of 100 college students were randomly sampled from students taking Psychology courses at the University at Buffalo. The State University of New York. We tested the following hypotheses: constraints being the lack of any bearing deficits or vocal motor disorder.

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Subject: Islamophobia

Major: Biological Sciences

Research Mentor: Dr. Benjamin D. Auerbach; PhD

Title: Analysis of Ultrasonic Vocalizations in a Rat Model of Fragile X Syndrome

Abstract: Fragile X syndrome (FXS) is a leading known inherited form of autism spectrum disorder (ASD) with deficiencies in social communication and sensory processing. It is caused by a mutation in the fragile X mental retardation gene (FMR1). Analogous to human communication, rats engage in social communication in the form of ultrasonic vocalizations (USVs). The purpose of this research is to determine if the mutations associated with ASD recapitulate the core communicative deficit features of this disease in rat models. To address this, USVs were collected and analyzed from control and Fmr1 KO rats from different rearing environments and call-inducing social conditions. Analysis of these USVs suggests that a complex interplay between genes and rearing environment influence the production of specific communicative deficit features of FXS.

Student: C. H. Chua

Major: Psychology

Research Mentor: Dr. Rina Das Eiden

Title: Paternal Psychopathology and Parental Attitudes From Infancy to School Age

Abstract: The purpose of the present study was to investigate the relationship between paternal alcohol problems and comorbid psychopathology in predicting fathers’ parenting attitudes in early childhood. Fathers play an important role in the rearing of their children; therefore, it is important to investigate negative parenting behaviors. This study examined the role of fathers’ alcohol problems and comorbid depression in predicting paternal warmth and aggression. Assessments were conducted at 15, 19, and 36 months and again at kindergarten age. Results from this study indicated that there is a significant main effect of child age on paternal aggression; this supports the idea that different developmental time points are related to changes in parenting attitudes. Also, a significant main effect of fathers’ depression on paternal aggression was found; this supports the hypothesis that fathers who are more depressed will be more aggravated with their children.


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Candida albicans: the most common pathogen in the Candida clade; an opportunistic yeast that is naturally part of the gut flora but in immunocompromised individuals becomes pathogenic. One factor that contribute to the pathogenicity of C. albicans is biofilm formation, which provide protection for microorganisms and are induced when they sense nutrient starvation conditions. One way cells sense nutrient availability and regulate metabolic pathways is through sirtuins; NAD+ dependent and regulate metabolic pathways is a group of developmental disabilities that cause difficulties in social interactions and other behaviors. Previously, Shank3 haploinsufficiency was identified as an autism risk factor that disturbs neuronal communication. Epigenetic studies have found the genes disrupted in autism are enriched in genes encoding the sirtuins, NAD+ dependent enzymes. In this present investigation; we tested to use Histone Deacetylase (HDACs) inhibitors to determine if it can serve as a potential form of treatment.

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**Student**

Chris Gnam

**Major**

Biological Sciences

**Research Mentor**

Dr. Zhen Yan

**Biomedical Sciences**
**Citation:** Jacobs School of Medicine & Biomedical Sciences, Jacobs School of Medicine & Biomedical Sciences

**Title:** Exploring the Effect of PI-88 on IFN-γ Signaling in Multiple Sclerosis

**Authors:** Priyanka Dongare, Michael Dwyer, Xiaozhong Wen, Sanjeevani Choudhery, Arsalan Haghdel

**Abstract:**

**Objective:**

To study the role of PI-88, a sulfatase inhibitor, on IFN-γ signaling in multiple sclerosis (MS). We hypothesized that PI-88 would mitigate the effects of IFN-γ on the demyelination of adult mouse cardiac fibroblasts.

**Methods:**

We used adult mouse cardiac fibroblasts and evaluated the impact of PI-88 on IFN-γ signaling. We performed western blots, immunofluorescence, and flow cytometry to assess the expression of key proteins involved in IFN-γ signaling.

**Results:**

PI-88 treatment significantly reduced the expression of IFN-γ receptors and downstream signaling molecules, indicating a reduced effect of IFN-γ on the fibroblasts.

**Conclusion:**

PI-88 may be a potential therapeutic agent for the treatment of IFN-γ-induced cardiac fibroblast dysfunction in MS.

**Keywords:**

Multisclerosis, IFN-γ, PI-88, cardiac fibroblasts, demyelination.
sacrificed at five days post lesion; during peak OPC recruitment. Preliminary data suggests an effect of M3R knockout (KO) on OLIG2+ OPC density in demyelinated lesions. This data suggests no effect on OPC proliferation; rather; M3R KO in OPCs promotes their differentiation.

Title
A Study of the Relationship and Mechanism of M3R Knockout on Bipolar Cell Activity in the DRG during Pregnancy and Infant Growth

Abstract
Childhood obesity is a public health issue. Our objective is to determine the relationship between maternal smoking cessation and infant growth; and their mediating mechanisms (sleep and appetite).
We used data from 20 mother-infant pairs from UB Pregnancy and Smoking Cessation Study. The relationship between maternal smoking cessation and infant anthropometrics (birth-12 months) was analyzed in SAS. Infant sleep and appetite were measured with Sleep Habit and Routine and Baby Eating Behavior Questionnaires; respectively.

Results showed that infants of quitters had higher mean birth weight and BMI (2.27 ± 0.40 vs 1.27 ± 0.07) than infants of non-quitters (2.50 kg [SD 0.40]; 1.70 [SD 0.21]). They had slower slope of BMI-Z score (0.01 [SD 0.04] vs 0.21 [SD 0.07]) from Birth-12 months. There was no significant differences in infant length.

In conclusion; maternal smoking during pregnancy is associated with lower birth weight and rapid infant weight gain. Smoking cessation can normalize birth and infant growth.

Students
Nader Cody Etkichehen

Major
Biomedical Sciences

Research Mentor
Dr. Jeff Saumon

Title
A Computational Model of Cannabinoid-1 Receptor Signaling in Cardiomyocytes

Abstract
This specific approach can be used to study the distribution of NBCe1 by fluorescence around the rim of the cell. At 30°C; Q913R showed a pattern of mislocalization. Further; we studied the distribution of NBCe1 by fluorescence in HEK cells; which is a kidney cell-line (HEK) by transfection and cultured the cells either at 37°C or at 30°C; a low temperature that restores the appropriate trafficking of other mutant membrane protein (e.g.; CFTR/ABCR in cystic fibrosis). We studied the distribution of NBCe1 by immunofluorescence microscopy. At 30°C; Q913R showed a pattern of mislocalization around the rim of the cell; similar to the wild type protein. Thus; this in vitro model of effective treatment and this system could be used to screen for chemical chaperones that mimic this effect.

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Ph240Leu channels and third, K-selected WT channels were made non-selective by the intracellular loop of the Ph240Leu channel. 

Simulated using lipopolysaccharide. 

The length- for- age z-scores did not differ between breastsfed and non-breastfed infants. Several other factors including infant gestational age; maternal BMI; gestational weight gain; and depression; were not associated with all length or growth length. In conclusion; breastfeeding substantially impacts infant growth trajectories in weight and BMI. 

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Alassane Mballo and wild-type mice. In order to study this, we carried out in vivo studies using fresh or frozen testes tissue from the Fbxo7 knockdown (KD) strain of mouse predicted to lack only Fbxo7 and proteasome activity during spermatogenesis. Deciphering the interactions between Fbxo7 and proteasome activity during spermatogenesis is required.

In a study investigating the causes of male sterility in Drosophila, Bader; et al; identified a protein necessary for sperm differentiation called Nutcracker; which induce priming or preparation for "A "s and "X"-only trial types; (ERPs) were extracted from the EEG. The results were also suggestive of differences in conflict monitoring and executive control between groups. Results were also suggestive of differences in conflict monitoring and executive control between groups. The findings provide insight into brain function associated with response priming and conflict monitoring in police officers; which may be related to training and or trauma exposure.

In the current study we investigated the causes of male sterility in Drosophila and testes tissue from the Fbxo7 knockdown (KD) and wild-type mice. Neutrophils; a main component of the innate immune system; which induce priming or preparation for "A "s and "X"-only trial types; were measured by ERG. Therefore; absence of Fbxo7 in retinal mice have a significant decline in visual function as compared to WT. Furthermore; absence of Fbxo7 in retinal mice have a significant decline in visual function as compared to WT. Therefore; absence of Fbxo7 diminishes the ER stress response which; over time; results in accelerated age-related dysfunction.

We investigated predictors for substance use among pregnant cigarette smokers; and the effects of co-use on success in smoking cessation; and maternal and infant health. Data of 58 pregnant daily smokers enrolled in the Uniform Pregnancy and Smoking Cessation Study were analyzed. Marijuana was the most commonly used substance during pregnancy (47.5%); followed by cocaine (3.1%). Risk factors for the co-use of marijuana among cigarette smokers included light cigarette smoking (64.3%); among light smokers [1-4 cigarettes/ day] vs. 26.8% among heavier smokers [10+ days]; development education (73.3% vs. 25.6%; high school); and having a partner with drug problems (100% vs. 31.3%). The co-use of marijuana did not predict the success in quitting smoking cigarettes; gestational weight gain; infant’s gestational age; weight; length; or body mass index at birth. In conclusion; cigarette smoking; education; and partner with drug problems are associated with co-use of marijuana; but marijuana does not predict major birth outcomes.

Expression of myosin IC isoform A tested and had their relative expression measured by ERG. Therefore; absence of Fbxo7 in retinal mice accelerates age-related deterioration in the mouse visual system.

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mechanisms are not completely understood. Our objectives are to examine 1) PTEN protein expression by various mechanisms modulated by Mop, 2) the chemotaxis response to additional chemokine modulators and 3) the impact of bacterial strains containing variation in the Mop protein on chemotaxis. Our results indicate that Mop affects chemotaxis of C5a and MIP-2 to impair neutrophil chemotaxis. Furthermore, bacteria possessing variation in their Mop protein sequence have different abilities to impair chemotaxis.

Student Elizabeth Quaye

Major Pharmacology & Toxicology

Research Mentor Supriya D. Mahajan

Title Methamphetamine Mediated Mitochondrial Dysfunction and Microglial Apoptosis

Abstract Methamphetamine induced damage of the nerve terminals of dopamine-producing neurons of the caudate nucleus triggers activation of apoptotic mechanisms resulting in the complete disintegration and death of neurons; astrocytes and microglia. Meth mediated apoptosis is accompanied by nuclear damage and differential expression of pro- and anti-apoptotic proteins. We have observed that increasing concentrations of Meth will cause cell death, which induces mitochondrial dysfunction leading to apoptosis induction. Gene expression of pro- and anti-apoptotic genes were quantified with qPCR using RNA extracted from cultured microglial cell line (HTH6). Our results showed a significant increase in the gene expression levels of apoptotic proteins like APAF-1; BAX and BCL-2 under Meth treatment. Analysis of Western blot data showed a significant modulation of the expression level of the anti-apoptotic BCL-2, with varying Meth concentrations. Using immunofluorescence analysis we examined the expression of mitochondrial proteins: Cytochrome C; COX 4 and MCL-1; which were significantly activated on Meth treatment indicating the activation of the mitochondrial-dependent (intrinsin) apoptotic pathway.

Student Thomas J. Rush

Major Biochemistry

Research Mentor Dr. M. Laura Feinberg

Title A New Partner and Function for Integrin α6β4

Abstract FMP22, whose under-expression causes Hereditary Neuropathy with Pressure Palsy (HNPP); interacts with integrin α6β4, a laminin receptor. Interestingly; animals haploinsufficient for FMP22 or ablated for integrin α6β4 develop myelin instability; though with different onset ages. To better understand the interaction between integrin α6β4 and FMP22 and if integrin α6β4 and laminin contribute to HNPP pathogenesis; we used mass spectrometry to identify proteins interacting with the α4 subunit in sciatic nerve. Examination of GO term enrichment shows an enrichment of integrin α6β4 interactors in calcium transport and G-protein categories. We confirmed that insulin-1,45-triphosphate receptor type-3; ITPR3; interacts with integrin α6β4 and is localized at the nodal/calvarial region of Schwann cells. Also; we demonstrated that ablation of integrin α6β4 in a mouse model of HNPP worsens nerve conduction velocity. The data presented here hints toward a new function for integrin α6β4 related to nodal organization and action potentials propagation in peripheral nerves.

Students Rebecca Simich, Phoebe Welch

Major Biomedical Engineering

Research Mentor Dr. Jinwoo Park

Title Simultaneously monitoring behavior and neurotransmitter release in rats exposed to drugs of abuse

Abstract Major-catecholamines such as dopamine and noradrenaline in the brain play a critical role in behavioral and physiological responses such as stress; reward; memory; and attention. In particular; when drugs of abuse such as methamphetamine are given to rats; extracellular catecholamine concentrations in the brain are increased causing inviolate behavior. Utilizing Fast Scan Cyclic Voltammetry (FSCV); via carbon fiber microelectrodes that are implanted into the Nucleus Accumbens (NAC); a limbic brain region; we can measure changes of dopamine regulation (release and clearance) based on total amount of Methamphetamine injected in real time. Then; using video cameras in the cage during FSCV recording; we can assess and rank the behavior and movement based on dosage of drug received. Finally; correlating the two neurochemical and behavior recordings; gives us a clear understanding of the effect of drugs of abuse; along with the long-term effects they have on dopamine system in the brain.

Student Kevin Stone

Major Biomedical Engineering

Research Mentor Jack Tseng

Title Variation in masticatory biomechanics and jaw shape in an elderly human population in Buffalo; New York

Abstract Human gross anatomy is a foundational field of knowledge in the biomedical sciences. Despite recent advances in understanding individual variation as a key variable in structure-function relationships in comparative anatomy; much of the individual variation in human musculoskeletal anatomy has not been quantitatively analyzed. This project aims to analyze computed tomography (CT) scans of five skulls from the UB Anatomy Gifts Program to understand the relationship between craniodental structure and biomechanics; as well as the influence of individual variation on that relationship. Jaw movement and exerted pressure during mastication (chewing) is recongized and simulated in vivo; performing experiments in vivo; the electrode cannot be permanently implanted in the animal. We are interested in designing a new CFM composed of a biocompatible material that can be permanently implanted. In this study; we fabricate a new CFM composed of fused silica and compare its catecholamine-detecting capabilities to the original glass-encased CFM.

Student Supriya D. Mahajan

Major Pharmacology & Toxicology

Research Mentor Christopher J. Russo

Title Layer-by-Layer Coated Intralipid Nanoparticles for Treatment of Influenza

Abstract Layer-by-layer coating is a technique used in developing nucleic nanoparticles to alter drug release; and biodistribution. Our ultimate goal is to demonstrate that using a layer-by-layer coating method for siRNA loaded Intralipid® nanoparticles will increase siRNA delivery to macrophages in the spleen; reduce its pathogenicity and its complications; and limit necrosis; an inadvertent side effect. We hypothesized that performing layer-by-layer coating on siRNA loaded Intralipid® nanoparticles would result in decreased necrosis in mice. siRNA; an inherited anesthetic; and a hydrophobic liquid at room temperature; readily partitions itself into nanoparticles upon vertexing for 15 seconds in a sealed container. After loading siRNA; alternating layers of positively and negatively charged polyacrylamides (dithioan and alginate; respectively) electrostatically bound to Intralipid® nanoparticles and excess reagents were removed via centrifugation (30C; 15 minutes; 100;000 g). Zeta potential and size was measured both pre- and post- concentration and confirmed layer- by-layer nanoparticle coating with little change to nanoparticle size.

Students Elizabeth Quaye

Major Pharmacology & Toxicology

Research Mentor Dr. M. Laura Feinberg

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School of Architecture & Planning

Student: Andrea Gonzales
Major: Environmental Design and Political Science
Research Mentor: Dr. Samina Raja
Title: Participatory Budgeting: Building Cities Through Inclusive Urban Planning Practices

Abstract: As rural cities like Buffalo; NY continue to experience development and investment; community leaders are calling on urban planners and policymakers to create stronger opportunities for engagement and inclusivity. Participatory budgeting; introduced in South America; is an opportunity for residents to have a say in municipal budgeting decisions by creating a voting structure where citizens can choose projects for public funding. Participatory budgeting aims at increasing government’s accountability and addressing quality of life issues for residents. In the case of Porto Alegre; Brazil - the city that participatory budgeting was founded - research has shown improvements in infrastructure and health quality since its implementation. My research proposal will explore the participatory budgeting model as it relates to urban planning and its possible implementation in Western New York.

Student: Madeleine Britt
Major: Environmental Design and Political Science
Research Mentor: Dr. Samina Raja
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Student: Dalia Garcia, Long Nguyen
Major: Environmental Design
Research Mentor: Dr. Samina Raja
Title: LIVE PLA Y GROW

Abstract: LIVE PLA Y GROW is a design proposal for a mixed-use residential complex in the downtown area of Buffalo NY. The design incorporates familial interactions and early childhood education and apartment type living. Public services include an onsite daycare facility; counseling services; as well as an Exploratorium children’s museum; all things that will attract families to downtown Buffalo. An integration of programming and supporting demographics aided in the decision to bring this programming typology to the downtown district; all conveniently paired with a variety of apartment types designed for multiple family sizes.

The overall design for LIVE PLA Y GROW is of a simple slab construction and carefully laid out column grid. The residential levels are supported by; as well as support; the public entities via inhabitable roof spaces and a truss like bridge and circulation system; representative of the familial support system brought about by the intended program.

School of Architecture & Planning

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Research Mentor: Dr. Samina Raja
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Adil Mansure
Research Mentor
Major
Student
supply.

improve inclusivity through product
purchase behavior at Mobile Markets
Food Systems Planning and Healthy
areas. The market was evaluated by the
Project which brings fresh produce
the Massachusetts Avenue Project
maintaining a nutritious diet difficult.
access to healthy; affordable food makes
insecurity—primarily in low-income
are various zones of concentrated food
neighborhood. Throughout the city of Buffalo there
in goods carried by local food markets?
closely related and play an important
backgrounds. Food and culture are

Abstract
The city of Buffalo is a diverse urban
home to people from a variety of ethnic
backgrounds. Food and culture are
closely related and play an important
role in everyday life. This research seeks
to answer the question: "Why should
neighborhood demographics play a role
in goods carried by local food markets?

Student Grace O’Connor
Major
Environmental Design
Research Mentor
Dr. Samina Raja
Title
Inclusivity through food retail: Why should neighborhood demographics play a role in goods carried by local food markets?

School of Engineering & Applied Sciences
Student
Major
Research Mentor
Title
Research

School of Engineering & Planning/ School of Engineering & Applied Sciences
Student
Major
Research Mentor
Title
Research

Student James Allen
Major
Electrical Engineering
Research Mentor
Dr. Jennifer Zirnheld
Title
Ice nucleating by Means of Pulsed Power

Abstract
Past research has been conducted to
explore the feasibility of utilizing the
exploding film phenomena to fracture ice in attempts to ease sea
navigation in Arctic regions. This study enhances those past works by
carrying out experiments under conditions that more closely model the
real-world application of the process. The exploding film phenomena was
induced across an aluminum metallized polyethylene film while frozen in
freshwater; and measurements were taken of the voltage and current
waveforms. The experiments were then repeated replacing the freshwater
with water containing salt at 35 parts per thousand. The work presents the
setup and comparison of the two sets of experiments.

Student Eun Asklar, Reckhukwu Chima
Major
Chemical Engineering
Research Mentor
Edward B. Kasparek PhD
Title
Data Acquisition System: For analyzing vibration and road noise in passenger vehicles

Abstract
The purpose of this project was to create an open-source hardware package that
can be used to record and analyze data for improving ride quality in luxury
vehicles. It originally used a project board and an SD card to track noise levels from different parts of the car.
Our team soon realized that such a type of device is capable of recording
different types of data and can be used in many applications. After doing
testing with different vehicles; we were able to fine tune and perfect our
software; such that now it can be used in many different ways; from recording
accelerations on three axes to tracking GPS coordinates.

Student Marcus Ashley
Major
Civil Engineering
Research Mentor
Dr. Jennifer Zirnheld
Title
Characterization of Non-Thermal Plasma

Abstract
Non-thermal plasma is produced by
sending a high voltage signal through a
goatless gas inside of a circuit which
emits the plasma as a small plume.
This study does not concern the
application of non-thermal plasma but
rather its features after it is applied. The
characterization of non-thermal plasma in
essentially to plasma to understand the
applications because all properties of
the plasma must be recorded to ensure
future usage is safe and accurate. The
emission of non-thermal plasma will be
 researched to deduce vital information
about how the plasma will react after
being implemented into medical
practices. The analysis of the emission
process will be carried out with an
optical spectrometer to report electric
field, electron density; and rotational
and vibrational temperatures. After
reporting its characteristics; more
conclusions about how non-thermal plasma can be implemented into a
practical setting can be made.

Students C H
Major
Mechanical Engineering
Research Mentor
Edward B. Kasparek PhD
Title
Investigation of Calcium Oxalate crystal morphology using additives in silicone hydrogel

Abstract
Calcium oxalate is the major constituent of
debridable renal stones. Calcium oxalate crystals exist in three forms:
monohydrate (COM); dihydrate (KDO); and trihydrate (CTO). COM crystals are most closely associated with
kidney stones. Additives with anionic functional groups have shown inhibitory effects on COM crystal formation. However; more research
must be done to understand the underlying mechanism behind these interactions. Hydrogel serve as an
analogous material for investigating the interaction in renal stones form. Using silica hydrogel matrices; we investigated
the efficacy and effects of additives; Trisodium Citrate and PSS (Polystyrene Sulfonate) in the inhibition of COM crystal formation and effects on COM crystal morphology.

Student C H
Major
Electrical Engineering
Research Mentor
Dr. Jennifer Zirnheld
Title
Myoelectric Hydraulic Exoskeletal Limbs

Abstract
his project aims to design and develop
exoskeletal limbs that can be utilized
to accommodate the needs of people who
have musculoskeletal abnormalities such as
multiple sclerosis; tendonitis; and myositis. It could also assist astronauts; who commonly suffer from muscle
atrophy due to weightlessness; as well
assist able-bodied individuals that are
looking to perform strenuous tasks. The
goal is to register a user input through the use of electrical impedance myography; which can then be used to
assist motor function through the use of hydraulic actuation.

Students Jennifer Barker, Samantha Brennen, Ahass Ibrahim, Jeremy Petrillo,
Devon cemented; Logan Robinson,
Zachary Salmi, Olivia Spellacy, Srram
Subramanian, and Samantha Vinog
Research Mentor
Dr. Kris Schindler
Title
UB Talker

Abstract
As an interdisciplinary group spanning medical and technical disciplines; we are working to develop communication
device for individuals with
Amyotrophic Lateral Sclerosis (ALS) who do not have the ability to speak.
Alongside other technologies; we have been working with a Brain-Computer Interface (BCI) to use electrical signals
from individuals’ nerve impulses to make
decisions on a computerized device. In the past we have used the BCI
to translate electrical activity generated in facial muscles by eye blinks into
morse code. Currently we are focused
on isolating brain waves associated with
speech; to create a brain-to-speech
interface which would facilitate
communication through a tablet. We also hope to use BCI technology to enable
the user to control elements of
their surroundings. The ultimate goal is to provide technology that expands
the user’s communication abilities and control over their environment in order to improve quality of life.

Student Adam Behrend
Major
Industrial and Systems Engineering
Operations Research
Research Mentor
Jun Zhang
Title
Modeling the Cost Effectiveness of Fire Protection Resource Allocation in the United States: Models and a 1990-2011 Case Study

Abstract
Fire-related hazards and incidents are an
collar/year. Currently we are focused
on isolating brain waves associated with
speech; to create a brain-to-speech
interface which would facilitate
communication through a tablet. We also hope to use BCI technology to enable
the user to control elements of
their surroundings. The ultimate goal is to provide technology that expands
the user’s communication abilities and control over their environment in order to improve quality of life.
about 30,000 fire departments across the country. The estimated total cost of fire was $329 billion in 2011; and yet there is little detailed information on cost-benefit analyses of resource allocation in fire protection. Leveraging the data from the National Fire Protection Association (NFPA) reports; we conduct a data-driven study to develop empirical and theoretical models to assess risk levels; develop risk reduction strategies and estimate the effectiveness of investment in fire protection. Our methods show high A-squared values; cost-effectiveness estimation and an optimal resource allocation model with fiscal considerations. This project provides some novel insights to policymakers and analysts in fire protection and safety; which would help in mitigating economic costs and saving civilian and firefighter lives.

Students Andrew M Bogdaci, Matthew W Chow, Nathaniel W Stephens
Major Chemical Engineering
Research Mentor Paschalis Alexandridis, Marina Tsianou

Title Self-Assembly of Nonionic Surfactants and Its Application in Solidification
Abstract We investigate non-ionic surfactants in terms of their ability to solubilize in aqueous solutions compounds that are sparingly water-soluble; including environmental contaminants; pharmaceuticals; and other important properties of the printed material within and through-thickness permittivity of the printed material is higher than that of the bulk polymer; due to the preferred orientation.

Students Runyoo Isabelle Cañeda, Heeba Karuppar
Research Mentor Geoffrey Challen

Title Leveraging the Internet for Scalable Seminars via internet-class.org
Abstract The internet is changing every aspect of our lives; including how we communicate; learn; navigate; organize; work; play; and love. The internet also represents a crowning achievement of computing; a single system unifying hardware and software; theory and implementation; standardization; innovation; engineering and science; protects that top-level governments and stupid cat videos. It only makes sense to start teaching computer scientists how the internet works. And what better way to educate about the internet than using the internet. The University at Buffalo computer science seminar How the Internet Works was exactly that; a chance to teach how the internet works; on the internet.

Students C Kun Woo Cho
Major Computer Engineering
Research Mentor Wenjie Xu

Title Gaze-Wasserstein: Exploring A Quantitative Scientific Approach to Autism Spectrum Disorders
Abstract Early detection of children with autism spectrum disorder (ASD) has been of great interest to researchers due to its early effect in the rate of autism incidence around the world. However; a diagnosis of ASD still challenges to receive in a timely manner for the large-scale population because the current diagnostic practice requires considerable cost and time. Additionally; the common clinical diagnosis practices are subjective and do not provide enough diagnostic feedback. In this paper; we explore a new ASD screening method; namely Gaze-Wasserstein; that is objective; fast; and widely accessible. Specifically; Gaze-Wasserstein implements the discrete gaze pattern distribution by establishing a modified 1st Wasserstein distance for dissimilarity measure. To test the performance of Gaze-Wasserstein; we conduct a pilot study with 32 child participants where 16 children have ASD and 16 children are typically developing. Evaluation results demonstrate effectiveness and time-efficiency of our proposed method in the Gaze screen; and indicating that Gaze-Wasserstein is a promising autism screening approach in the clinical practice.

Student S Fatou Cisse
Major Chemical Engineering
Research Mentor Arend van der Zande

Title Growth Techniques to Synthesize Scalable Two-Dimensional Materials
Abstract Single-walled carbon nanotubes have a high recovery of graphene: research on 2D materials has attracted significant attention in the area of nanomaterial research. Recently; more interest is being paid on heterostructure devices fabricated with multiple 2D materials. Different methods have been employed to synthesize 2D materials. Mechanical exfoliation is one of the methods used but it does not produce sufficient results as CVD and MOVD. This research mainly focuses on the process of synthesizing large area of monolayers 2D materials; especially molybdenum disulfide. The monolayer will be used for different applications such as electronic devices. We are investigating the effects caused by a seeding layer and the cleaning of the substrates. Sapphire; fused silica; and silicon dioxide substrates were used to determine if the orientation and the quality of the printed material; for example; atomic force microscopy (AFM); and electron microscopy (SEM) are improved.

Student $ H Abdulmaali Davies
Major Chemical Engineering
Research Mentor Mark Swinhardt

Title Synthesis of Yolk-Shell Structured Silicon-Germanium Anode Materials for Lithium-ion Batteries
Abstract The move towards a more sustainable world requires more efficient energy storage systems. New materials are needed to improve the storage capacity and other important properties of existing batteries. The lithium-ion battery (LIB) is the most efficient energy storage system because of its relatively high energy density and low self-discharge rate. Silicon-germanium (SiGe) alloy nanoparticles can potentially be used to create anodes with much higher specific capacity than graphite; the most common anode material in LIBs. However; these materials suffer from degradation due to volume change upon cycling and contraction during the lithiation and delithiation process. To address this challenge; we are preparing carbon-coated SiGe-based anodes in order to accommodate volume changes. Starting with SiGe nanoparticles obtained using a laser reactor; we expect to achieve a SiGe@carbon@SiGe hollow structure utilizing mostly solution-phase techniques; Li-ion batteries incorporating SiGe alloy anode material; will show improvement in key performance metrics.

Student ☼ Emma DePuro
Major Mechanical Engineering
Research Mentor Tarunraj Singh

Title Development of Activity Tracker for Diabetic Patients
Abstract The research being explored is the variation of glucose dynamics across a set of patients to study blood glucose regulation in diabetic patients. A software called TDSS is being utilized to form different controlled experiments in order to validate and understand these relationships. If a mathematical representation of the relationship can be established; then that can be used to predict the amount of insulin required on a daily basis; with more precision.

Student ☽ Moity Dreyer
Major Environmental engineering
Research Mentor Jane J Jensen

Title Sustainable Plan for Restoration of Riparian Habitat on the North Shore of Lake LaSalle
Abstract The project involves the planning of a sustainable basin; with a focus on reducing nutrient loading and improving overall water quality. This will be achieved through the installation of rain gardens and other green infrastructure practices. The project will also involve public engagement and education to promote sustainability practices.
Abstract
The parabolic solar trough is a drinking water treatment device which utilizes the reflective geometric properties of a conical shape to efficiently concentrate sunlight. The device can be suspended above the curve; will simulate solar tracing analysis. A laser; mounted on the north shore of Lake LaSalle. The results of a previous analysis of soil type; water quality; and local solar characteristics serve as parameters for the design of a sustainable shoreline environment. Planting native species in the riparian zone will encourage biodiversity. This project is the design of a sustainable shoreline environment. The vegetated area adjacent to a waterbody is an integral ecosystem service. The study of small length scale flames is of interest due to the potential for applications to power small scale devices. This is difficult to achieve in practice due to a lack of understanding of small scale flame phenomena. Swirl flow has been shown to provide a strong stabilizing effect but there is little experimental work showing how multiple swirl flow regions interact to further this stabilizing effect. A 2x4 mesoscale burner array was designed to study the effects of swirl flow interactions. The effectiveness of this method in improving flame stability and extending the flammability limits of flames was evaluated via a measure of flame temperature. The results showed a reduction of the lean blow-out of equivalence ratio with increasing radial to axial air flow ratio. This expansion of the lean flammability limits shows the feasibility of swirl flow implementation in future mesoscale devices and mesoscale flame studies.

Title
An Investigation Of Electroactive Polymer Materials As A Mechanism Of Shape Memory

Students
Rita Grenez, Connor Martin
Major
Aerospace & Mechanical Engineering
Research Mentor
Jihyung You

Title
Demonstration of twist-controlled 3D printed mesoscopic burner array using gaseous hydrocarbon fuels

Abstract
The feasibility of small length scale flames is of interest due to the potential for applications to power small scale devices. This is difficult to achieve in practice due to a lack of understanding of small scale flame phenomena. Swirl flow has been shown to provide a strong stabilizing effect but there is little experimental work showing how multiple swirl flow regions interact to further this stabilizing effect. A 2x4 mesoscale burner array was designed to study the effects of swirl flow interactions. The effectiveness of this method in improving flame stability and extending the flammability limits of flames was evaluated via a measure of flame temperature. The results showed a reduction of the lean blow-out of equivalence ratio with increasing radial to axial air flow ratio. This expansion of the lean flammability limits shows the feasibility of swirl flow implementation in future mesoscale devices and mesoscale flame studies.

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The feasibility of small length scale flames is of interest due to the potential for applications to power small scale devices. This is difficult to achieve in practice due to a lack of understanding of small scale flame phenomena. Swirl flow has been shown to provide a strong stabilizing effect but there is little experimental work showing how multiple swirl flow regions interact to further this stabilizing effect. A 2x4 mesoscale burner array was designed to study the effects of swirl flow interactions. The effectiveness of this method in improving flame stability and extending the flammability limits of flames was evaluated via a measure of flame temperature. The results showed a reduction of the lean blow-out of equivalence ratio with increasing radial to axial air flow ratio. This expansion of the lean flammability limits shows the feasibility of swirl flow implementation in future mesoscale devices and mesoscale flame studies.

Title
An Investigation Of Electroactive Polymer Materials As A Mechanism Of Shape Memory

Students
Rita Grenez, Connor Martin
Major
Aerospace & Mechanical Engineering
Research Mentor
Jihyung You

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students: such as isofluorane: are effective in suppressing the immune system. We hypothesize that a novel agent: intralipid: nanoparticles loaded with isofluorane can modulate immune system response and aid those infected with the influenza virus and induces narcosis. To prevent narcosis: positively-charged chitosan is electrostatically bound to the negatively-charged intralipid® nanoparticles. The coating allows for a controlled release of isofluorane to the macrophages in the target area. Through dynamic light scattering measurements: the size of the particles and the surface charge are measured to confirm the presence of the chitosan coating. Current testing indicates attachment of chitosan with aggregation of nanoparticles. Syringe filters are being used to remove large aggregates.

Title: Characterization of an Electronic Throttle Body

Abstract: This group performed system identification of an electronic throttle body (ETB) through analysis of unit step responses to determine its characteristic equation. Additionally: a PID control algorithm was implemented on an Arduino for easy software testing. Tuning parameters for flexibility in implementing different controllers for different end use needs of the ETB.

Title: Flow in Patient Specific 3DP Models for Design Optimization of Distal Coronary Stents

Abstract: Validation of a CT-FFR software tool for digital transmission in sensor networks (UWSN) using M2I system. From this analysis; it can be determined which modulation method will produce the most efficient and effective transmission within the UWSN communication system.

Title: Augmenting Smart Phones into Functional Tools for Home-Based Rehabilitation

Abstract: The rates of water exchange in Fe(III) complexed with iron chelating agents. Fe(III) agents had the best relaxivity at higher temperatures was calculated. In order to determine the activation energy and rate constant of water at various temperatures were fit to Swi•-Connick equations squares fit of the data; the exchange rate constant of water at various temperatures was calculated. In addition: phantom MRI scans at 4.7 T were used to determine which Fe(III) agents had the best relaxivity altering effects. In vivo tests were then conducted with mice to determine if the agents provide suitable contrast in comparison to clinically used Gad(III) agents.
Chemical and Biological Engineering

Major

New discoveries still being made.
Continuous growing project with many morphology. Research for this topic is affect descriptors; but it is still unclear fraction of intermolecular hops; TUG falling short of representing challenges in home and community environments that many seniors navigate. Having information on the motor performance in more complex environments can better inform clinicians about an individual’s risk of falling. To this end, we present Smart Insole TUG, an advanced system suitable for the complex environmental TUG. Consisting of an unobtrusive sensing insole and a fine-grained TUG data analysis module, our system evidences four refined aspects in the gait feature and segments the TUG process by its detailed phases; providing accurate and advanced information for the fall risk estimation.

School of Management

Students

Varin Vang, Hangnang Zhang

Major

Chemical and Biological Engineering

Research Mentor

Dr. Prasad Balkundi

Research Mentor

Muris Avdic

Major

Psychology

Research Mentor

Dr. Frasad Balkundi

Title

Measuring Quarterback Efficiency

Abstract

The objective of the project was to create a statistic that measures quarterback play. With the existing metrics; it is difficult to objectively measure the success of quarterback play. The most used metrics in the back play is the passer rating. The passer-rating statistic is beneficial in that it scales every quarterback score to a maximum value of 180.5; giving the illusion that individual performances are close together when they are not. The statistic was made using research from The Hidden Game of Football; and developed using R and advanced Excel techniques. I analyze traditional numbers and statistics; and insert these numbers into my stat to calculate how efficient and productive a performance was.

Student

Anna Dammer

Major

Business Administration

Research Mentor

Vejlo Fiskal

Title

Corporate Social Responsibility

Abstract

This poster demonstrates the significance of corporate responsibility by presenting qualitative and quantitative data comparing several companies. Starch indicates that socially responsible companies have a competitive advantage to companies with poor reputations. The poster will display key findings about the impact companies have on consumers; workplace environment; and society in graphs and brief descriptions. The take-home message is the corporate-level social responsibility improves public relations; sales and garners positive feedback from customers.

Student

Jake Cercone

Major

Business Administration

Research Mentor

Laura Amo, Diana Cicchoki

Title

Measuring Quarterback Efficiency

Abstract

The purpose of our project is to take raw data collected from the Olmstead Center for the Blind and transform it into user-friendly charts in order to provide useful insights for our client. Through our data analytics work; we hope that Olmstead is able to further improve the performance of its call service line. We analyzed the data for the Olmstead’s various call teams; length of calls; length of after-call work; and the amount of time a caller spends waiting to talk to an agent. Using the advanced Excel skills we developed during our MQ408 course; we created a dashboard and menu system that makes all of the graphs change dynamically in a user-friendly way.

Student

Gabriel Gee, Megan Gramza, Pengebo Ma, Andrew Meyer, Anirudh Ojha

Research Mentor

Laura Amo, Diana Cicchoki

Title

Artificial Creative Solutions: Shedding a Light on Olmstead’s Center for the Blind Call Line

Abstract

The analysis is done through a lens of intangible assets and goodwill. This research is a review research on differences and similarities of GAAP and IFRS on assessment; recording of intangible assets and goodwill. This paper juxtaposes four different theoretical perspectives in the context of the recent American presidential election. The which of them are best supported by the data. The first view is that people live in echo-chambers and possess voting behaviors akin to their friends and family. The second view is that people have a specific conception of what constitutes effective leadership and they use this heuristic to determine whether a political candidate is worthy of their support; or lack thereof. The third view is that the media is one suchforums through which individuals are influenced by the information they are provided about certain candidates that could impact their political affiliations. A fourth and final perspective is the notion that past negative experiences with certain political sectors symptoms has proven to be the impetus for a wave of disgruntlement and establishment movements. I test these four competing predictors of voting behavior using data from three different samples. In doing so; I seek to determine the primary basis upon which voters make decisions in the context of social; cognitive; media; and discontent based theoretical perspectives that have predominated research. In a study that one predominately drove the voting behavior in the latest American election.

Student

Anna Dammer

Major

Business Administration

Research Mentor

Vejlo Fiskal

Title

Corporate Social Responsibility

Abstract

This poster covers three distinct phases of the 2008 financial crisis: the calm before the storm; the crash itself; and the lasting economic and regulatory impacts that continue to persist today. Data analysis is done through a lens of AIC.
For the 2017 Target Case Competition, our team’s analysis of Target’s Flexible Fulfillment program; we discovered the key issues and trends introduced by guests using the program and the team members executing it. We seem to enjoy the benefits it provides but found ourselves lacking convenience when compared to those of Target’s Competitors. Our solution providing strategies to make Flexible Fulfillment more efficient and increase guest satisfaction to ultimately create a greater stream of revenue and a larger percentage of sales through this program leading to higher overall profitability for Target. We designed a brand new tracking process; which can serve as an engaging tool helping guests’ accurately track their orders. This tracking device will serve as a useful tool for people on the go and will further improve the overall guest experience.

Students
Robert Lanzalcio Jr.

Major
Business Administration

Title
Starting my own Business - Smooth Roll’n Food Truck

Abstract
These are the best ideas are the ones; which are the most well thought out; the ones that are well thought through; and initial thought. Well maybe; some of the best ideas are the ones you do not think over; and rather just do. Using my knowledge acquired from outside resources and SOM classes such as Accounting; Marketing; MIS; and Finance; I have successfully been able to begin the process of creating my own business: Smooth Roll’n Food Truck. Having suffered with traffic; and the now-growth of food trucks; Smooth Roll intends to provide an alternative; healthier option for people than your traditional food trucks. My goal is to be able to share my passion for a healthier lifestyle with those around me.

Students
Sonya Tarake, Alva Putra, Evan Sidarta

Major
Business Administration

Research Mentor
Dr. Chong

Title
Giving Back to the Community: A Legacy of Cheerful Service

Abstract
The objective that my group and I set out with was to give back to the community of my own hometown; as well as other western New York communities who supported our group over the years. Through many hours of organization and volunteer front line work; I witnessed multiple seasons of growth within the organization I helped revive. The poster project is simply a closer look at how I achieved these tasks; and how I fit in with the social responsibility that many groups and companies search to attain in current times.

Students
Maxwell Savarino

Major
Business Administration

Research Mentor
Vejko Fotak

Title
Target Flexible Fulfillment

Abstract
As one of the biggest retail stores in the United States; Target is always looking for ways to improve their service quality for their customers. Through flexible fulfillment; Target’s customers do not have to go to the stores to buy the products that they want. By simply ordering online; they can pick up the products after they place an order for free; without having to wait for many rooms for improvement; and our group made three recommendations to improve that certain area. First; our group wants to fix Target’s website layout to be more effective in online shopping. Second; we want to use advanced technology like drones to help employees pick up the products from the floor and the backroom. Finally; we recommended Target to use fast and easy pick up system by using pick up lockers.

Students
Barley Popovski, Samuel Soucy

Title
Why individual Social Responsibility is important in Business School

Abstract
Computer and Social Responsibility is the initiatives companies make that effect themselves as well as society economically; socially; and environmentally. CSR can provide numerous benefits to a company. For example; when businesses start thinking consciously about ways they could help the environment; the consequences may be a decrease in maintenance costs. Companies don’t need to be the only ones who enjoy these benefits though. This project is going to help depict how anyone can benefit from being socially responsible. We will mainly be focusing on how individual Social Responsibility can be extremely helpful in business school. The poster gives a clear and precise definition of what being socially responsible actually means; the cause and the effects of CSR activities; a comparison of two hypothetical business students to show what one makes when they aren’t socially responsible; as well as local opportunities to help inspire people to be socially responsible.

Students
Bailey Lanzalcio

Research Mentor
Dr. Chong

Title
Study Abroad & Employability

Abstract
In today’s globalized world environment; where understanding how things have become commonplace; is imperative that the U.S. have a competitive edge to set themselves apart. Studying abroad and experiencing life in a foreign culture is an effective way for students to differentiate themselves from their peers. Students gain a wide scope of knowledge and experience when taking classes abroad. They obtain a unique perspective on their chosen field of expertise; and learn to adapt to a new environment through exposure to these comfort zones. The hard and soft skills that students who study abroad develop translate well into the workplace. Students leave this experience more well-rounded; which is what employers seek.

Students
Leann Balcerzak, Janelle Garcia

Major
Business Administration

Research Mentor
Sue Furlani

Title
Club Member to Club Hero!

Abstract
Course hero’s vision is to be able to help any student or educator ask and answer any question in any course in the world. Their mission is to build the world’s biggest and best library of course-specific questions and answers to help students and educators master their classes. By helping students and educators to share their knowledge; Course Hero empowers students to learn more effectively and succeed; both in and out of the classroom. This ed-tech company based in Silicon Valley also hires interns from all across the nation to serve as the face of the brand off the computer screen. Through a mutual connection; I was fortunate enough to be remotely hired by this company and later brought on Spencer Li to our Buffalo Hero Team. For our project; we will cover our full range of experiences as Content Acquisition/ Business Development Interns to my becoming a Brand Ambassador and later Campus Lead. We will present on how this company has facilitated our collective growth as emerging leaders in the SOM.

Students
Sharma, Izzy Khan, Deshawn Kunath, Anthony Yeh

Research Mentor
Paul Atkinson

Title
The Net Social Benefit of Large Bank Holding Companies

Abstract
A series of different factors play a role in determining the benefit provided to society by large Bank Holding Companies (BHC). These benefits range from cost savings through lower fees or competitive rates to the availability of branches nationwide (or internationally). These large BHC’s can offer these services because of economies of scale and scope. As the institutions grow larger in size and diversification; cost savings could eventually be passed onto the consumer. This paper examined how large the value of this cost savings is (and how likely it is for it to be passed on to society) against the risk-adjusted value of possible loss to the nation’s economy in case of a natural disaster (tail-risk realization). We found that Dodd-Frank and Basel III; although improvements; do not mitigate this risk to the point where the size of these institutions provides a net benefit to society.
Substance use and insomnia are prevalent among college students. This is an ongoing study examining the association between substance use and sleep. This suggests that email-delivered CBT-I demonstrated more positive attitudes and behaviors towards sleep-related stimulus control; sleep restriction; sleep hygiene; and daytime sleepiness in a sample of insomnia college students who have been enrolled in a sleep education study.

School of Pharmacy & Pharmaceutical Sciences

Students: Scott Ferguson, Jake Maga, Jinli Wang
Major: Pharmaceutical Sciences
Research Mentor: Julianne Nguyen

Title: Pegylated exosomes show enhanced accumulation in the infarcted myocardium
Abstract: Pegylated exosome lipid vesicles secreted from cells that carry a diverse set of drug cargo destined for delivery to neighboring cells and distant organs. Similar to synthetic lipid delivery vehicles known as liposomes, exosomes have been explored as an alternative carrier for novel therapeutic applications. One of the limitations of pegylated liposomes is their short circulation half-life. As Polyethylene glycol (PEG) has been well established as an effective polymer in extending the half-life of liposomes and numerous other nanoparticles; we have explored the use of PEG in enhancing the circulation half-life of exosomes to obtain higher accumulation in the infarcted myocardium. In vivo biodistribution studies showed enhanced accumulation of pegylated exosomes in the infarcted heart compared to unmodified exosomes. Further, pegylated exosomes showed lower non-specific deposition in the lung and thus could provide a safer and more efficient alternative to unmodified exosomes.

School of Nursing/ School of Pharmacy & Pharmaceutical Sciences

Students: Marlene Morales, Terrika Pereira, Alexander Salinas
Major: Nursing
Research Mentor: Yu Ping Chang
Title: Examining the Effectiveness of a Modified E-mailed Delivered CBT-I on Sleep Outcomes in College Students with Insomnia
Abstract: Cognitive Behavioral Therapy for Insomnia (CBT-I) has been established as an effective non-pharmacological treatment for adults with insomnia and is based on changing sleep-related behaviors and thoughts through patient education. There is limited research on CBT-I in college students. This study aims to examine the effectiveness of an e-mail delivered version of CBT-I on sleep outcomes in college students with insomnia. A new group pre-and-post design was used. The intervention group receives a 6-week email delivered version of CBT-I consisting of stimulus control; sleep restriction; sleep hygiene; relaxation training; cognitive restructuring; and sleep hygiene promotion. Preliminary findings indicate that participants in the intervention group demonstrated more positive attitudes toward sleep; better sleep quality; less daytime sleepiness and better sleep hygiene; compared to the control group. This suggests that email-delivered CBT-I might have the ability to improve sleep outcomes and promote healthy sleep in college students.

School of Nursing/ School of Pharmacy & Pharmaceutical Sciences

Students: Terrika Pereira, Alexander Salinas
Major: Nursing
Research Mentor: Yu Ping Chang
Title: The Association between Alcohol Use and Sleep in College Students
Abstract: Substance use and insomnia are common problems in college students primarily due to stress, lifestyle change; and peer influence in this age group. Substance use can have negative impact on students’ health and academic performance. The most common causes of sleep disturbances in college students are sleep deprivation e.g. insufficient sleep; sleep because they go to bed late and wake up early) and inadequate sleep hygiene (e.g. eating before bed). Poor sleep practices coupled with stress; alcohol consumption; and technology use prior to bed can contribute to sleep deprivation and subsequently: daytime sleepiness. However; little is known about the association between alcohol use and sleep. This is an ongoing study aiming to describe the association between substance use; sleep hygiene; and daytime sleepiness in a sample of insomnia college students who have been enrolled in a sleep education study.

School of Nursing/ School of Pharmacy & Pharmaceutical Sciences

Students: Jie Hong
Major: Pharmacological Sciences
Research Mentor: Dhavalkumar K. Shah
Title: Design and Generation of Humanized Anti-Topeconate Single Chain Variable Fragment (scFv) for Inverse Targeting Strategy
Abstract: Inverse Targeting is a strategy designed to minimize the doselimiting systemic toxicity of intraperitoneal (IP) topotecan chemotherapy. This strategy employs systemic (IV) co-administration of anti-topotecan antibodies with IP administration of topotecan. It is hypothesized that the coadministration of anti-drug antibody IV and chemotherapy IV can effectively reduce peak systemic drug exposure and the cumulative systemic exposure to unbound drug. We have previously shown that a high affinity murine anti-topotecan antibody (i.e. 8C2) is capable of achieving Inverse Targeting in IP topotecan chemotherapy and reducing its systemic toxicity. In this poster; we present extension of our previous work towards the use of single-chain variable fragment (scFv) of 8C2 to increase the homing of framework region miniahuman scFv sequence to human antibodies. Our results demonstrate that it is possible to do novel design humanized scFv for a murine anti-topotecan antibody with enhanced expression in mammalian cell line.

School of Nursing/ School of Pharmacy & Pharmaceutical Sciences

Students: Benjamin Yee
Major: Pharmaceutical Sciences
Research Mentor: Dr. Marilyn E. Morris
Title: Effect of Type 2 Diabetes (T2D) on Renal Megalin; Cubulin; and Catabolic Function in the Zucker Diabetic fatty (ZDF) Rat Model
Abstract: Proteins are both a clinical marker and major contributor to the progression of diabetic nephropathy (DN). To explore mechanisms underlying this; we examined the impact T2D had on renal endocytosis and catabolism of proteins in Type 2 diabetic ZDF rats. Creatinine-normalized urine samples run on SDS-PAGE gels confirmed a worsening of proteinuria in ZDF rats. RT-PCR was performed on renal cortices at 12; 19; and 29 weeks to represent different stages of DN. Our results validated megalin as an appropriate housekeeping gene in DN kidneys. mRNA of the endocytic and catabolic proteins megalin and cubulin showed a trend of an increase at 12 weeks; followed by subsequent decreases at 19 and 29 weeks. We measured significant increases (p < 0.05) in mRNA of the lysosomal enzymes cathepsin B at 12 weeks and cathepsin D at 19 weeks. This work suggests a significant impact on kidney protein endocytosis and catabolism in diabetes.

School of Nursing/ School of Pharmacy & Pharmaceutical Sciences

Students: John B. O’Donnell
Major: Pharmacological Sciences
Research Mentor: Dr. Yu Ping Chang
Title: Exergaming Intervention in Sedentary Middle-aged Adults Improves Lower Extremity Functional Fitness and Physical Activity Efficacy
Abstract: Interactive video game technology; known as exergaming; has been extensively utilized in rehabilitative settings. This technology may help increase self-efficacy; which could promote physical activity and functional fitness. The purpose of this study was to compare functional fitness and self-efficacy in relationship to exercise tests and self-reported questionnaires. Middle-aged sedentary men and women (n=12) completed functional fitness tests and self-efficacy questionnaires before and after engaging in self-selected; low to moderate-intensity exergaming for 20 min/3d/wk for eight weeks. Exercise using interactive video game technology increased functional fitness after exergaming. Middle-aged sedentary adults improved in Sit-To-Stand repetitions (14.2 - 16.8; p < 0.05). All participants reported with 100% confidence they would continue to exercise if an interactive video game system was available. Exergaming improved lower extremity functional strength and endurance for sedentary middle-aged adults as well as their confidence to continue exercising.

School of Nursing/ School of Pharmacy & Pharmaceutical Sciences

Students: Sean M. Kohler; Katherine T. O’Donnell; Daniel M. Rosen; Mengtian Tian
Research Mentor: Peter Horvath, PhD
Title: Exergaming by Sedentary Middle-aged Adults Increases Physical Activity, Dietary Intake and Physical Activity Efficacy

School of Nursing/ School of Pharmacy & Pharmaceutical Sciences

Students: Dmitry V. Belov; Sabrina M. Daniels; Courtney E. Miller; Katherine T. O’Donnell
Research Mentor: Peter Horvath, PhD
Title: Exergaming Intervention in Sedentary Middle-aged Adults Improves Lower Extremity Functional Fitness and Physical Activity Efficacy
Abstract

The purpose of this study was to assess changes in dietary and physical activity among sedentary middle-aged adults who consistently participated in interactive exercise gaming (exergaming).

E2 sedentary; middle-aged men/women without access to a gym; or fitness

exercising for 20 minutes; for eight weeks. They were instructed to not change diet and physical activity. The intervention. Physical functioning scores approached significance after intervention (4.6 to 8.0, p < 0.08). The SEE5 showed that after exergaming subjects felt slightly tired; but not drained. They also reported feeling positive and not discouraged post exercise. Exergaming might improve physical functioning and have a positive effect on sedentary individuals attitude toward exercise and general health.

The Academies

The Academies introduce students to links between classroom and practical learning through five inter-disciplinary lenses: Civic Engagement, Entrepreneurship, Global Perspectives, Research Exploration, and Sustainability. Each Academy uses its themes as a means of focusing discussion, organizing experiential learning opportunities, and offering

Students

Research Mentor

Dr. Peter Horvath

Research Mentor

Dr. Peter Horvath

Research Mentor

Dr. Peter Horvath

Research Mentor

Dr. Peter Horvath

Research Mentor

Dr. Peter Horvath

Abstract

Metabolic syndrome is a grouping of several health and disease risks; hypertension; and cardiovascular disease which affect biochemical processes, and it is difficult to perform simple everyday tasks; possibly even leading to premature death. One of the major factors that alter metabolic syndrome is one’s diet. The effects of diet in different age groups range from developmental stages prior to birth to adulthood. A deficiency in several nutrients such as Vitamin A; vitamin E and maternal energy imbalance may increase the risk of metabolic syndrome. During adulthood dietary factors that influence metabolic syndrome are excess calories; excess sodium intake; and lack of antioxidants (micronutrients and phytonutrients). Possible interventions to prevent the occurrence of metabolic syndrome include an increase in fruits and vegetables and specific micronutrient supplementation as well as a return to traditional low sodium diets.

Students

Research Mentor

Research Mentor

Research Mentor

Research Mentor

Abstract

Metabolic syndrome is a condition diagnosed based on certain symptoms that increase an individual’s risk to metabolic disease and type 2 diabetes. The symptoms include large waist circumference; low HDL levels; high blood pressure; high triglycerides; and abnormal glucose levels. The United States has one of the highest prevalence of metabolic syndrome; along with China, Mexico, India, and Turkey. This pattern is directly correlated to overpopulation disease and obesity and with diets consisting of processed or sugary foods; rich in artificial and fat foods. Some people may be predisposed to metabolic syndrome based on genetics such as obesity; lipoprotein size and density; and different blood pressure; increasing an individual’s risk of developing metabolic syndrome. Lifestyle patterns; including physical activity; also influence the development of metabolic syndrome. By increasing daily physical activity; altering diet and changing steps to prevent obesity; the onset of metabolic syndrome can be prevented and reversed.

Student

Major

Environmental engineering

Research Mentor

Research Mentor

James N. Jensen

Title

Evaluation of Natural Absorbent Material for Menstrual Health Maintenance in Low-Resource Settings

Abstract

Lack of menstrual health maintenance (MHM) supplies in low-resource countries has profound effects on the lives of girls. For example, it is known that school attendance is low when MHM supplies are unavailable. The current effort at UB in using sustainable natural materials for water treatment (EmPOWER: Empowering Sustainable Water Treatment) has been extended to MHM supplies. This poster will present the results of an experimental study to evaluate sawdust as an absorbent material for sanitary pads. Larger particle diameter sawdust (between 297 and 841 um) absorbed about 3.1 g water/g sawdust; while smaller particle material (less than 297 um) absorbed about 2.3 g water/g sawdust. For both particle sizes; absorption of water by sawdust was nearly at equilibrium after 5 minutes. Implications for MHM will be discussed.

Students

Research Mentor

Research Mentor

Research Mentor

Research Mentor

Title

Branding the Lines of Food Labels

Abstract

The ambiguity of food labels and packaging is a global issue because the design is more towards selling a product rather than informing a consumer. The deceptive nature has led to the expression of food items which has resulted in exacerbating health issues such as obesity; heart disease; and diabetes. Dietary guidelines; artificial claims; and targeted packaging are all used to manipulate and can lead to not changing food labels harm consumers and the food industry. These manipulations target those who may not be well-informed in the subject of nutrition. It is imperative that specific and accurate modalities of universal labeling for food items be introduced globally. Packaging and labeling should include mandatory warnings; as well as simplified laymen terms for complicated chemical terminology.
Today’s poster symposium is a microcosm of the diverse research and creative projects ongoing at The University at Buffalo. In limiting the number of student presentations from the various undergraduate schools, a wide variety of scholarly and creative works was able to be showcased. During this poster session we celebrate UB’s undergraduate students and their faculty mentors who are engaged in innovative work and scholarly research. The nominated student works you are viewing are stellar examples of the undergraduate research opportunities available to UB students. Thank you for joining us today as we “Celebrate Excellence” in undergraduate research and creative works.

In Memoriam

Over the years, our UB students involved in research and discovery have benefitted from the advice and service of many passionate faculty and professional staff members. While there are many to thank for this extra service and commitment, we reflect today on a friend to research and discovery; the late Dr. Peter Nickerson.

Dr. Nickerson, a former professor in the Department of Pathology and Anatomical Sciences was a dedicated champion of undergraduate students involved in research and discovery. While Peter is greatly missed, we carry on his enthusiasm for solving the unsolved and making the world an even better place. Thank you Dr. Nickerson for having shared your passion with all of us.