



CELEBRATION *of*
ACADEMIC EXCELLENCE

UNIVERSITY AT BUFFALO
THURSDAY, APRIL 19, 2007

Center for the Arts



SCHOOL OF ARCHITECTURE & PLANNING

Student

Ashley Anne Latona

Faculty Mentor

Laura Garofalo

Title

Liners

Abstract

LINERS is a collection of work which explores planar and linear materials that perform programmatic functions. A liner is a continuous membrane which groups and conforms to elements that have similarities. In that sense, a liner may be a sheet of wood, which folds in section to form a bed, desk and storage unit. This would be an example of a "furniture liner." Other liners include "service liners" which wrap their content to provide utility services (gas, water, electricity, communications, etc.) to the spaces that require them. "Privacy liners" create different visual separations within the space without enclosing. This collection of work focuses on the functions of liners, groupings, and the material characteristics that supplement the liner's functions.

Student

Daniel Stripp

Faculty Mentor

Omar Khan

Title

Constrained

Abstract

Architecture always has constraints or limits placed upon it; very rarely, if ever, is one able to develop a project without adhering to some type of control on the design. Whether the limits on the design are the site, the client, the budget, etc. they are always present. For example, even this presentation has the constraint of needing to be housed on a specific size board. I believe, however, that the point where the conceptual ideas of a project meet these constraints is where the design can flourish. I will describe the complexity of this transformation between idea and constraints through a number of academic projects.

Student

Stephanie Vito

Faculty Mentor

Annette LeCuyer

Title

Work/Live

Abstract:

This project explores an alternative to the traditional live/work space, where it provides a work/live environment for artists and a leisure/live environment for affluent patrons, and invents a circulation of finances that supports the artists with the income from the affluent occupants. The work and live spaces are physically separated on the site. Connection between the two occurs physically through transitional elements, and digitally through digital projection of artists' work. In contrast to existing urban complexes which offer uniform treatment the facade regardless of the inhabitant, the double sided, inhabitable projection/work screen allows for artistic expression on the facade from individuals within. The screen allows artists to expose their work to the public and creates a visually stimulating urban edge.

ENVIRONMENTAL DESIGN

The following student researchers are displaying exemplary work under the guidance of their faculty mentor, Angelika Breinlich, M.U.P. University at Buffalo Instructor, Environmental Design, Department of Urban and Regional Planning. The student names, majors and project titles are listed below:

Student

Chris Contento

Major

Environmental Design B.A.;
Geography Minor

Project

Statler Towers

Student

Courtney Creenan

Major

Environmental Design B.A.;
Architecture Minor; Art History Minor

Project

Buffalo Museum of Science

Student

Lora Cunningham

Major

Environmental Design B.A.;
Art History Minor

Project

Tapestry School

Student

Kimberly Daugherty

Major

Environmental Design B.A.;
Architecture Minor

Project

New Era Block

Student

Kyle Dudgeon

Major

Environmental Design B.A.;
Architecture Minor

Project

Hertel Avenue

Student

Kyle Mastalinski

Major

Environmental Design B.A.;
Architecture Minor

Project

Electric Minor

Student

Kailee Neuner

Major

Environmental Design B.A.;
Mathematics B.S.; Architecture Minor

Project

Saturn Club

Student

Kristen Niemi

Major

Environmental Design B.A.;
Architecture Minor

Project

800 West Ferry

*Student***Danielle Rovillo***Major*Environmental Design B.A.;
Architecture Minor*Project***The Church***Student***Christopher Schaut***Major*

Environmental Design B.A.

*Project***St. Louis Roman Catholic Church***Student***Maya Shermer***Major*Environmental Design B.A.; Romance
Languages & Literatures Minor*Project***Market Arcade***Student***Wilson To***Major*Environmental Design B.A.;
Architecture Minor*Project***Granite Works****COLLEGE OF ARTS & SCIENCES***Student***David Bapst***Department*

Geology

Faculty Mentor

Charles E. Mitchell

*Title***Disparity in Late
Ordovician Graptolites**

*Student is also a participant in the Sigma Xi
Scientific Research Society. Abstract listed
under Sigma Xi.

*Student***Rachel Berkeley***Department*

Department of Anthropology

Faculty Mentor

Dr. Tina Thurston

*Title***Re-discovering the past at
Temple Beth Zion***Abstract*

The Temple Beth Zion in Buffalo, NY experienced a fire in 1961. With the fire came the partial destruction of historical records pertaining to a collection of important religious objects numbering more than two dozen. In my work at the temple I take a complete description and series of photographs of each item creating an "item" report. I then examine what partial information we have coupled with such things as repairs, stamps, engravings, and historically known design changes in similar objects to help date the item. After the report has been compiled, I work with other Temple staff to design an individual preservation plan for each piece that serves their needs for easy accessibility while providing long term stability for the object. This usually includes overseeing repairs and providing for long and short term storage options.

*Students***Jessica Bertine, Kate O'Brien
Jennifer Tillapaugh***Department*

Department of Theatre and Dance

*Faculty Mentors*Gary Casarella, Lynne Koscielniak,
Catherine F. Norgren*Title***Original Stage Design for American
Premier – Card Index Scattered***Abstract*

The Card Index Scattered, by Tadeusz Rozewicz, adapted and directed by Kazimierz Braun, premiered in fall 2006.

The play is about the protagonist, Hero, who recalls moments of his life. Our visual solution for the play was an abstract street supporting Hero's enclosed and fragmented world. Isolated areas of light reinforced the distorted reality of Hero. Costumes and sound conveyed the specific people Hero encountered in his life.

As designers we collaborated with the director to create the visual and auditory environment of the play. Our discussions and research helped us to define the atmosphere of the play.

To inform the director what we envisioned, we provided color renderings, perspective drawings and images that inspired our choices. In order for the work to be realized, we created ground and light plans, front elevations, paint elevations, and working drawings for the technical staff.

*Student***William R. Calabrese***Department*

Department of Psychology

Faculty Mentor

Leonard J. Simms, Ph.D.

*Title***Self and Peer Reports of Normal
and Abnormal Personality and
Interpersonal Problems***Abstract*

The main purpose of the current research is to examine how distress arising from interpersonal sources relates to normal and abnormal ranges of personality as measured by both self- and peer-report ratings. The present study explores this relationship through the administration of the Inventory of Interpersonal Problems-64 (IIP-64; Horowitz, Alden, Wiggins, & Pincus, 2000) and The Schedule for Nonadaptive and Adaptive Personality 2nd Edition (SNAP-2; Clark, Simms, Wu, & Casillas, in press) to a sample of undergraduate friendship dyads (N = 153). Correlational analyses show that both the self and the peer conceptualize the self's personality and interpersonal problems in similar ways. Additionally, informant ratings on the IIP were shown to better predict target rated personality using the SNAP as opposed to the Big Five Inventory (BFI; John & Srivastava, 1999). These results show some utility for the SNAP as a new measure of personality and in relating to circumplex structures of interpersonal problems.

*Student***Kenny Coogan***Faculty Mentors*

Jon Riszko, Debra Kolodczak

*Title***Project Title Dogs: Past and Present***Abstract*

Poster reflecting my independent
research interests:

Domestic animals (dogs, cats etc.) are a large part of American society and unfortunately often overlooked. The independent study that I will be doing next semester with Debra Kolodczak will get me familiar with people's notion of domestic animals. My various tasks include: researching, collecting, and interpreting images of people and pets interacting. I am working with the digital archives of the U.S. Library of Congress, and also interviewing people on and off camera. This Independent study extends my work with Dr. Virginia Calkins M.D., who is an experienced dog trainer/breeder as well as a



distinguished MD (retired). My interactions with Dr. Calkins will be video taped and my research on collecting and cataloging archival photographs and artwork may be used for content in a television documentary program pertaining animal behavior, particularly the interactions between human and dog behavior. This documentary program is now in production by the supervising faculty. This collage of photographs shows some of my favorite images I have collected thus far.

Student

Kyle Hacker

Faculty Mentor

Kathryn Medler

Title

Calcium Buffering in taste cells

*Student is also a participant in the Sigma Xi Scientific Research Society. Abstract listed under Sigma Xi.

Students

Andrew King, Amy Holzapfel and Sarah Bay-Cheng

Department

Theatre Performance

Title

Dramaturgy Casebook for the University at Buffalo's production of Berlin to Broadway with Kurt Weill: a Musical Voyage

Abstract

Gathering information for the cast, director, and designers of this production. The casebook included information on Kurt Weill, his wife, Lotte Lenya, the musicals mentioned in Berlin to Broadway, and life in East Berlin in the 1980's (The Berlin Wall, Socialism, the younger generation's reactions to the time, their views on West Berlin and America, and important people during the time). The casebook also had image collages on the different topics mentioned above. I also made a website with all my information from the casebook allowing the people involved in the production to always have access to it.

Student

Carolyn Lagoe

Faculty Mentor

Mary Cassata, Ph.D.
Department of Communication

Title

Effective Health Care Campaigns and Appeals In HIV/AIDS Prevention

Abstract

Annually, there are about 40,000 new cases of HIV reported in the United States. This has been a dramatic decline from the 150,000 reported each year in the late 1980s. What types of health care campaigns have been responsible for this decline? This study will try to determine what types of health campaign appeals would be most effective in HIV/AIDS prevention of undergraduate students at the University at Buffalo. A literature review will be conducted to study campaigns that have been successful in targeting people with similar demographic characteristics as students at UB. After the successful campaigns are found, the characteristics of the messages will be reviewed to determine whether they fall into the categories of logical, emotional, novel or fear appeals. Since a few different demographic groups are going to be studied, certain prevention techniques and appeals may prove more effective for some groups but not others.

Student

Agnieszka Laskowski

Department

Biology

Faculty Mentor

Dr. Kathryn Medler

Title

Characterization of Potassium-Dependent Sodium/Calcium Exchangers in Taste Receptor Cells

*Student is also a participant in the Sigma Xi Scientific Research Society. Abstract listed under Sigma Xi.

Student

Heather Menz

Faculty Mentor

Tina Thurston

Title

Irish Souterrains and a Regional Analysis of Known Souterrains, County Cork, Ireland

Abstract

Souterrains are built subterranean features found in Ireland, associated with settlements of various types as well as in isolated positions, dating to the period between AD 500 and 1200. While their construction and features are well described, scholars still argue over their purpose: were they utilitarian storage areas, hiding places in times of danger, or places to conceal valuables? I examine their locations, features, the theories of previous scholars, and present my own analysis of souterrain locations in County Cork. My analysis has drawn me to the conclusion that at least in some cases, the souterrain may have been associated with an early manifestation of the historically recorded tradition of the Irish "booley village."

Student

Ann Marie Olivo

Department

Department of Linguistics

Faculty Mentor

Dr. Jeri Jaeger

Title

The phonological variation of Latin American Spanish

Abstract

The phonologies of the varieties of Latin American Spanish are changing. These differences have been documented before as in Zamora and Guitart (1982). In some speakers' speech, the /s/ phoneme is realized as [h] in certain environments. There are also cases in which [l] substitutes /r/. The realization of the /r/ phoneme also differs from variety to variety. In this study, I plan to answer the following questions: 1. What is the pattern for the realization of /s/ as [h]? 2. What is the pattern of substitution of [l] for /r/?

3. How is the /r/ phoneme realized in the different varieties? I will show that /s/ is realized as [h] in syllable-final position and is usually deleted word-finally; [l] and [r] are in free variation; and depending on the variety and environment, /r/ is realized as [x], [r], [ʁ], [z], or [ʒ].

Students

**Adam Pollack, Adam Williams
Carolyn Lagoe, Emily Morosi**

Faculty Mentor

Mary B. Cassata, Ph.D.
Department of Communication

Co-Mentor

David Urbanek, Lieutenant
University Police

Title

**Serving the Buffalo Community
and Beyond**

Abstract

As part of Dr. Cassata's honor seminar, there was a research, as well as an experiential component. Several of the students engaged in experiential activities on a local, national, and international level. On the local level, the majority of the class has been working to implement a Bike Path safety initiative, which involves students working in coordination with the University Police to help ensure a safer Bike Path. On the national level, students traveled to Bayou La Batre, Alabama to provide their services for Hurricane Katrina relief. On the international level, some students traveled to Israel to participate in a ten day interactive retreat to learn, discover, and gain an increasing awareness of the culture and struggle in the Middle East.

Student

**Melissa Poulos, Callie Johnson
Giancarlo Alvarez, Nicole Williams**

Faculty Mentor

Michael A. Stefanone, Ph.D.

Title

**Exploring Social Exchange Online:
Public Conversations
In the Blogosphere**

Abstract

Recent research suggests people's social network context predicts blog use, where network size is positively related to adoption of blogs to maintain these networks. The current research explores the extent to which traditional rules for relationships apply to this new form of computer-mediated communication. Twenty personal journal style bloggers participated in focus groups targeting equity and reciprocity

dimensions of social exchange, characterized by directed self-disclosures fundamental to successful relationships. However, today bloggers expect to maintain these relationships through non-directed self disclosure via publicly available content posted to their blogs. Participants indicated they have clear expectations for reciprocity from their readers and that it be equitable in terms of depth and intimacy, consistent with traditional rules. Consistent with social learning theory, the authors suggest a relationship between reality TV, which models non-directed self-disclosure, and the maintenance of personal journal style blogs. They also suggest avenues for future research in terms of privacy boundary maintenance.

Student

Collin Ranney

Faculty Mentor

Lynne Koscielniak

Title

**Behind Design: A journey through
the Scenographer's Visual Thought
Process**

Abstract

To be an artist of the theatre, one must possess the visual fluency to communicate evocatively and effectively, along with the sharp intellect able to analyze the structure of a script. He or she must also be an adventurer with courage enough to trust that the collaborative process will lead to the proper destination. In my exposure to, and the study of the theatre, I have gained these skills.

Scenography as a design area in theatre is driven by the underlying poetic values of the script, and the designer seeks to express the dynamic structure of relationships and the psychic structure of the play's context using architectonic forms. My design journeys and experiences through the texts of Copenhagen, A Moon for the Misbegotten, She Loves Me, and Clean House range in scenographic expression from boldly theatrical, abstract expression, to designs that utilize period specific forms in a metaphoric way.

Student

David E. Roberts

Title

National Forest Canopy Study

Abstract

In the Chequamegon National Forest in Northern Wisconsin a spatially intensive sap flux study seeks to find mechanistic controls on canopy transpiration along environmental gradients. It has been found that large variations of

transpiration exist along an unevenly distributed moisture gradient extending from the upland forest to the forested wetland. It has been hypothesized that this variability could be explained in part by soil moisture. However, to test this hypothesis we required intensive within-plot soil moisture measurements, to evaluate a large set of soil moisture observations made extensively across the study area. The intensive study consisted of four plots, two from upland plots and two from wetland plots. In previous years soil moisture data was collected by taking 3-5 random samples per plot on 144 plots. To test the validity of this approach for both upland and wetland plots we recorded soil moisture at plot center and also 5 samples in 0.5m increments in the NW, N, NE, SE, S, SW directions. We statistically compared mean soil moisture values from among and within plots. Our results show that the forested wetlands have the greatest within plot soil moisture variation. A 3D GIS model was created to help visualize areas of the study site that may need further validation for soil moisture variability. For example, significantly raised areas on the 3D model may point to inadequate soil moisture measurements. The implications of this study are that 3-5 random samples of soil moisture may adequately capture plot means in upland regions, but in wetland regions a more rigorous sampling procedure is needed to ensure that robust relationships are found between canopy transpiration and soil moisture.

Student

Elizabeth A. Silverman

Faculty Mentor

Mary B. Cassata, Ph.D.

Title

**Content Analysis of Online Message
Boards: Viewers' Reactions to
Daytime Storylines Involving
Illnesses and Deaths**

Abstract

For more than fifty years, daytime television dramas have presented storylines that focus not only on personal relationships, but on current events and topics of concern to many viewers, such as contemporary health issues. Increasingly in recent years, daytime television dramas have featured storylines focusing on AIDS/HIV, breast cancer, eating disorders, and heart attacks, among other health issues. In this research project, done in conjunction with the Department of Communication's Project Daytime, the researcher sought to determine viewers' responses to such health-related



storylines through content analysis of four online message boards for seven daytime television dramas between January 25th and February 28, 2007. The results indicated that although viewers appreciated the health storylines, they were frustrated by the lack of depth and unrealistic portrayal of such illnesses, particularly breast cancer and AIDS.

Student

Margaret Starostik

Title

Characterization of Calcium Binding Proteins in Mouse Taste Cell Transduction

*Student is also a participant in the Honors Program and the Sigma Xi Scientific Research Society. Abstract listed under Sigma Xi.

Student

Benjamin Weill

Faculty Mentor

Lynne Koscielniak

Title

Art Informing Light: A Designer's Process

Abstract

As a designer, I use art images to help inform me of what the specific world of the play needs to look, and more importantly, feel like. For Eugene O'Neill's Long Day's Journey into Night, there was a distinctly dark and oppressive feeling to the majority of the imagery that I found. What this told me as a designer was that I had to be able to isolate specific points of action while leaving the rest of the stage in darkness. For Oscar Wilde's The Importance of Being Earnest, the images I found had a light and airy quality to them. This helped to inform the decision that this play should be showered in light and texture.

Students

**Adam Williams, Maggie Sheldon
Michael Spiegel, Amy Pagnanella**

Faculty Mentor

Mary B Cassata, Ph.D.

Title

Unplugged: Attempting to Walk in a Media Free World

Abstract

With the growing use of technological advances in our ever evolving world students are becoming more dependant on their use of electronic technology on both the macro and micro level. A college student's life is broken down into two major parts: academic and social. Electronic media use is an integral part of both of these aspects. With the developments of complex communication devices, distance learning tools, portable media, along with the ever increasing need to use technology in order to keep up socially, it is truly a struggle on today's campuses to go even a day without media use. Eleven students from Dr. Cassata's Communication Honor's class went two days without using any form of media, in an attempt to measure how the deprivation of media would affect a college student's daily life.

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

Student

Mame Afrane

Faculty Mentor

Dr. Frank V. Bright

Title

Microenviroment 'pH' on Molecular Levels with Biodegradable Polymers

Abstract

Recent developments in biodegradable polymer (BP) research have allowed BP's to be used as effective drug delivery systems. However, by products created during degradation (e.g., lactic acid) may decrease microenvironment 'pH'. In turn, this may result in the denaturation of the active cytokines and growth factor (drugs) resulting in reduced or nullified activity. Seminaaphthorhodafluor (SNARF) is a fluorophore that actively responds to varying pH within its microenvironment. By using SNARF we can the local microenvironment within a BP system. This poster will discuss the local 'pH' within polymer systems based

on poly (L-Lactic acid) (PLLA) and Pluronic P104. In addition, we explore the effects of polymer chains or proteins on microenvironment 'pH' surrounding the SNARF probes.

Student

Mary Akuamoah-Boateng

Faculty Mentor

Dr. Mark Swihart

Title

Efficient Grafting of Multiple Organic Molecules onto Photoluminescent Silicon Nanoparticles

*Student is also a participant in LSAMP. Abstract listed under LSAMP.

Student

Amos Chery

Faculty Mentors

Bianca Weinstock-Guttman and Murali Ramanathan

Title

Mathematical Model for Multiple Sclerosis and Autoimmune Disease

Abstract

To characterize the Smirnova-Stepanova model of autoimmune disease and to assess its ability to describe the clinical course of progression of multiple sclerosis. The Smirnova-Stepanova model is derived from three differential-algebraic equations that describe the dynamics of the tissue, the autoimmune response and antigen. In this model, tissue homeostasis is assumed to be maintained via a logistic process involving regulated capacity-limited proliferation and the autoreactive immune response is to mediate tissue injury via interactions between the immune system and healthy tissue. Antigen is assumed to be generated during the interactions between autoreactive components of the immune system and healthy tissue and provides the stimulus for amplification of the immune response.

*Student***Joel Urena***Faculty Mentor*

Dr. Charles Grose

*Title***Different Trafficking Patterns of a Major Varicella - Zoster Virus Glycoprotein***Abstract*

Glycoprotein gE is the major glycoprotein of the Varicella-Zoster Virus (VZV). Previous work has shown that human antibodies against gE recognize multiple forms of the glycoprotein, whereas the mouse monoclonal antibody (MAb) 370 against gE in VZV-32 (wild type) infected melanoma cells does not. To further investigate these findings, melanoma cells infected with VZV-32 were treated with MAb 370 and 3B3, two mouse primary monoclonal antibodies against gE, and Human gE, also a primary monoclonal antibody against gE. Upon treatment with the antibodies the cells were then stained with fluorescent antibodies. As seen by confocal microscopy images, the infected cells stained against gE with MAb 370 had more of a restricted staining pattern relative to the cells stained against gE with the human monoclonal antibody. These results suggested that MAb 370 stained against gE when it was present mainly in the Golgi, a site of glycoprotein synthesis.

SCHOOL OF ENGINEERING AND APPLIED SCIENCES*Students***Simone Appelt and Andrew Widjaja***Department*

Industrial and Systems Engineering

Faculty Mentor

Rajan Batta and Li Lin

*Title***Simulation of Passenger Check-in at the Buffalo Niagara International Airport***Abstract*

Delays in the check-in system at an airport vary with times of the day, day of the week, and types of check-in modes chosen by the passengers. Passengers are eager to efficiently pass through the check-in process and security checkpoint in order to guarantee they will make their flight on time. Extensive data collection of the check-in system can be used to build a simulation that will adapt to changes. The poster explains the data collection process, simulation modeling, and scenario analysis for the check-in procedure at the Buffalo Niagara International Airport. Results from this

study can be linked to other processes (security checkpoint and parking) in order to obtain information on a passenger's experience at the airport. The goal of this study is to identify delays and create scenarios that will improve the efficiency.

*Student***Christine Balonek***Department*

Chemical and Biological Engineering

Faculty Mentor

Dr. John Hardy and Dr. Ninel Nica, Nuclear Physics Department, Texas A&M University

*Title***New precise alpha-K measurement as part of a test of internal conversion theory - 166 keV transition in 139La***Abstract*

Precise internal conversion coefficients (ICCs) are crucial to the study of nuclear decay schemes, including spin and parity designations, transition rates, and branching ratios. However, various calculations of ICCs disagree with one another and with experiment by several percent. The situation is further confused by the fact that very few ICC measurements have uncertainties under 1%. Until recently, it was even unclear if the calculations should incorporate the hole left by the departing conversion electron. To remedy this situation, we have set out to measure the K-shell ICC values of three different isotopes to that precision. The ICCs for 127.55 keV E3 transition of ^{134}Cs and 661.657 keV M4 transition of ^{137}Ba have already been completed. We report here on the third and final case: the 165.858 keV M1 transition in ^{139}La .

Students

Amy Bird, Tim O'Donoghue, Chelsea Marshall, Victoria Kaiser, Miranda Robinson, Jeffrey Boorsma, Ricardo Euyoque, Cory Tufano, Donald Taylor, Thomas Najuch, Robert Wurstner, Paul White, Justin Darling, Josiah Johnson, Brandon Rhea, Gregory Duell, Robert Schiller, Mark Roetzer, William Smith, Jayce Grefrath, Geoff Lehman, Joseph Kasperski, Jess Broudeux

Department

Civil, Structural and Environmental Engineering

Faculty Mentor

Todd Snyder

*Title***Design, Construction, and Racing a Canoe Made of Concrete***Abstract*

Undergraduate students in CSEE design, build, and race a concrete canoe as part of a national competition. During the competition, the bridge is judged on its appearance, its design (through a poster, oral presentation, and written report), and its speed in the water through a series of races. To be competitive, the canoe must be of low weight. The concrete is specially-formulated to maintain high-strength, low-weight conditions, with foam beads as aggregate, microfibers, and small-diameter (1/8-inch) reinforcing bar. The resulting concrete has a density of 61 pounds per cubic foot, very similar to the density of water. During construction, the concrete is applied over a Styrofoam core in three layers. The overall wall thickness is 0.5 inch.

*Student***Jason Cieri***Department*

Electrical Engineering

Faculty Mentor

Jennifer Zirnheld

*Title***Design of an Electromagnetic Lifting Device***Abstract*

This project involved designing an electromagnetic lifting device to meet a set of constraints. A project of building a large scale pinball machine was completed recently as a part of a technical elective course. As a follow on to that course design plans were developed to create an electromagnet which would lift a metallic ball and carry it to the next stage in the device. An iron cylinder was used as a core and was wound with copper wire. Calculations were performed to determine the parameters necessary to provide functionality. The electromagnet was then constructed based on these parameters. The design and construction of the electromagnet is presented.

Students

Walter Fairlie and Jeff Gardiner (co-chairs), Lindsay Bain, Desiray Cisar, Tom Coyne, Rick Elsenbeck, Jon Herman, Chris Ignatowski, Vince Lovullo, Greg Nelson, Nadine Roberts, and Neda Stoeva

Department

Civil, Structural and Environmental Engineering

Faculty Mentor

Todd Snyder

*Title***Steel Bridge: Design, Construction, and Competition**

*Abstract*

Undergraduate students in CSEE design and build a steel bridge as part of a national competition. The bridge must span a distance of 19 feet. The bridge is about 3.5 feet wide and 5 feet tall. It must support a load of 2500 pounds. During the competition, the bridge is judged on its appearance, construction speed, vertical deflection, horizontal deflection, and weight-to-deflection ratio. In addition, a poster is developed for the competition. Due to the importance of construction speed, special tools will be built by the team for the bridge construction process. Team members must follow industrially-recognized safety procedures. To simulate the construction of a bridge spanning a river, the team members cannot stand under the bridge during construction. The team plans to use an environmentally-friendly, low-VOC powder coating.

Student

Steven Jeanjulien

Department

Electrical Engineering

Faculty Mentor

Jennifer Zirnheld

Title

Effects of Pulsed Capacitive Discharge on Ice

Abstract

Metallized film and copper wire were subjected to high voltage capacitive discharges in order to test their abilities to shatter ice. Copper wire with a length of 5" and gauge of 36 and 5 mil thick metallized film with the dimensions 2.5" by .5" were frozen into a 2.55" by 1.65" by 1" ice sample. A 15 kV pulsed capacitive discharge was applied across each sample and the resulting current and voltage waveforms were integrated over time to determine the energy dissipated. Results will be used in efforts to provide an alternative to shattering ice in icebound seas.

Students

Adam Kraus and Brianna Clark

Department

Electrical Engineering

Faculty Mentor

Jennifer Zirnheld

Title

Effect of Metallized Polypropylene Film Properties on Plasma Formation

Abstract

Experiments have revealed that applying a high voltage capacitive discharge to capacitor grade metallized polypropylene film (MPPF) results in similar behavior to that of an exploding wire. Tests have been performed on two types of MPPF in order to study the effect of film properties on the transient plasma generation mechanism when exposed to a fast rising high voltage capacitive discharge. These properties include metallization thickness, film length, and sheet resistance. The effects of these properties are observed in the current waveforms. The experiments utilized MPPF samples of various lengths and metallization thicknesses. Each sample was subjected to a 2.5 kV capacitive discharge. Trends in current, power, energy, and time duration were observed from the collected data and compared to that of an exploding wire.

Students

Brian McSkimming, Gene Wang, Josh Gardner

Department

Computer Science and Engineering

Faculty Mentor

Adrienne Decker and Carl Alphonse

Title

Students Helping Students: A Software Design Tool Developed by Students for Students

Abstract

The Green tool was developed with the pedagogical goal of focusing beginning CSE students on modeling and design. Development of Green is undertaken by a team of student developers guided by faculty advisors; its initial development was funded by an Eclipse Innovation Grant. Students use Green to create class diagrams from code, and to generate code by drawing class diagrams, thereby demonstrating the duality of design and implementation. It has given students in the classroom a

tool that grows with them as they learn, and the student developers an insight into not only the workings of larger pieces software, but also into how to meet the needs of their fellow students. UB students are the driving force behind the project in all respects, providing goals and the know-how to build the program.

Student

Nadine Roberts

Department

Civil, Structural and Environmental Engineering

Faculty Mentor

Scott Weber

Title

The Engineer's Role in Eminent Domain

Abstract

Based on a competition hosted by the American Society of Civil Engineers, this poster presents the engineer's role in eminent domain. The competition combines the skill of technical writing, along with interpretation of the ethical duties and responsibilities of an engineer. The goal of the competition was to stimulate younger engineers to consider elements of the engineering profession other than its technical elements. Judging is based on the originality and creativity of ideas.

Students

Robert Russello, Eric Nagler, Brenda Lynn Chodkowski, Johnpaul Wiejaczka

Department

Computer Science and Engineering

Faculty Mentors

Kris Schindler and Michael Buckley

Title

The UB Talker: An Augmentative Communications Device for the Speech-Impaired

Abstract

Developed by students in CSE, the UB Talker is an augmentative communications device which speaks for speech-impaired people. The device is capable of auto-scanning, which enables

a quadriplegic to use the software without the need for a mouse or keyboard. Students are developing techniques to improve auto-scan in an effort to approach the efficiency of direct selection with the ease of use auto-scan. Additional work is focused on a children's version of the device, making it more conducive for a classroom setting. Since a number of children may use the same device, it's important the one device be able to be easily and quickly configured between children. The Talker is also being enhanced to provide control of household appliances in order to be a full-service device for the handicapped.

Students

Hung Van and Ben Spearin

Department

Electrical Engineering

Faculty Mentor

Vladimir Mitin

Title

Power Consumption through Advancement in Technology

Abstract

This exhibit uses an incandescent bulb, LED bulb, and quantum dots to show the efficiency of power used to produce lighting. The exhibit shows the versatility and effectiveness of using quantum dots, a fascinating nanotechnology, to produce lighting.

UNIVERSITY HONORS PROGRAM

Student

Rahul Chopra

Title

A Capitalist Africa

Abstract

Capitalism is an economic system in which all or most of the means of production are privately owned and operated for profit. The focus is on how capitalism the predominant economic system in the 20th & 21st centuries affects Africa.

Although many factors affect economic growth and general well being, focus will be on how these factors effect the economy and results will be that compared with success/failures of other continents or countries that do or don't have a capitalist based economics system.

Student

Fara Ditekowsky

Faculty Mentor

Dr. GERALYN R. TIMLER

Title

Social Knowledge in School-Age Children with Language Impairment

Abstract

Descriptive studies of peer interactions reveal that children with language impairment (LI) manage social situations less effectively than typically developing peers do. Little is known about the social knowledge that underlies this compromised social performance. This study investigated social knowledge in school-age children with and without language impairment (i.e., a LI and a Typical Group) and examined the relationship between children's social knowledge and parent/teacher reports of children's social performance. Study stimuli included twelve hypothetical peer conflict vignettes presented across an open ended and forced choice question. In both conditions, the LI group generated and selected fewer prosocial responses than the Typical group. In the LI group, selection of more prosocial strategies was significantly associated with lower scores in teacher report measures of children's problem behaviors.

Student

Catherine R. Dunning

Faculty Mentor

Dr. Stacy Hubbard

Title

The Line Between Propaganda and Poetry: Connotation, Crossover, and Misconception

Abstract

This research explores the line between poetry and propaganda in the context of World War I. WWI is the point in time at which propaganda, as we know it, began to take shape; this development includes the formation of the negative connotation attached to the word "propaganda." My research begins by clearly defining propaganda; it then analyzes four WWI poems in order to determine their status as propaganda or not, as well as their depth as poems. Finding that many poems can clearly fall into multiple categories, the analysis leads to the question of /how/ poetry can be categorized as both art and propaganda.

The research concludes with a clear explanation of the contexts in which a text can function as both propaganda and valuable poetry simultaneously.

Student

Anna Hansen

Faculty Mentors

Dr. Wei Sun and Dr. Richard Salvi

Title

Neonatal Nicotine Exposure Delays Development of Auditory Temporal Resolution

Abstract

Maternal smoking leads to cognitive and learning deficits in children and adolescents. Moreover, neonatal nicotine exposure has been found to impair cell proliferation and synaptic developments in the central nervous system. In the auditory system, chronic nicotine exposure in newborn rats impairs auditory cortex (AC) function. Recent studies suggest that AC impairments lead to deficits in auditory learning in adult rats. Since the AC plays a crucial role in auditory learning and the processing of complex signals, we hypothesized that neonatal nicotine exposure might lead to deficits in auditory temporal acuity. To test this hypothesis, we exposed neonatal rats to nicotine and assessed their auditory temporal acuity by using a gap (silent interval) detection paradigm to assess pre-pulse inhibition of the acoustic startle reflex. The gap detection threshold of a high dose nicotine group and a control group showed a significant difference suggesting high dose nicotine exposure may induce long lasting temporal resolution deficits that persist into adulthood.

Student

Brett Juhas

Faculty Mentor

Dr. Mollendorf

Title

Peristaltic Bowel Flow Simulation Device

Abstract

This project involved the development of a device that accurately simulates the peristaltic flow through the infant small intestine. This tool will be used to help determine optimal surgical techniques for surgeons at the Women and Children's Hospital of Buffalo. It is designed in collaboration with pediatric surgeons along with University of Buffalo mechanical engineering and medical school professors. Simulation is required because of the highly complex nature of infant digestive flow. Previous fluid models failed to accurately predict pressure deflections and corresponding fluid dynamics created within the intestinal wall. A working prototype has been fabricated and is currently being



assessed. The device pumps water between two reservoirs, while accurately measuring flow. Air pressure applied in controlled bursts, activates the artificial intestinal walls in a way that propels the fluid forward. Precise triggering and control of solenoid valve sequence is essential to control and our ability to modify a simulated peristaltic wave. The working prototype will eventually give way to a much larger fluid channel where longer intestinal profiles can be characterized.

Student

Khelly Koomalsingh

Faculty Mentors

Laura Garofalo and Shadi Nazarin

Title

WATEaiR

Abstract

Through utilizing the transformation from two dimensions to three dimensions, a given space is created in which water and air act as the main structural components. The process is derived from a series of conceptualized explorations of light, shadow, structure, and space. A dynamic resolution is produced in which this temporary structure not only provides a unique space but also stretches the limits of both architecture and construction.

Student

Iluska Lippke

Faculty Mentor

Dr. Jeannette Ludwig

Title

The Effects of Technology on Language and the Emergence of SMS

Abstract

Mobile phone text messaging (SMS) is a world wide phenomenon worthy of notice by economists and social scientists alike, and the rapid growth of this industry has brought up many questions concerning its effects on the main user demographic, adolescents and young adults. Will this technology affect the way young people communicate? Will the "language" used in this medium cross over into other domains of written

communication? Will it change modern languages as we know them, or will it remain restricted to that medium?

To explore those and other questions, this study conducted background literature surveys and interviews and collected demographic information and samples of text messaging from the participants. Based on the findings, the social aspect of text messaging reflects trends and general tendencies worth exploring in further research, while the linguistic effects of text messaging may be better examined in a project of much larger scope. While the issues require further exploration, I believe the case studies presented here show a tendency towards specialization of a domain for already existing social purposes.

Student

Peter Rizzo

Faculty Mentor

James L. Maynard and Alfred D. Price

Title

Partnership for Progress

Abstract

In many areas of the United States institutions of higher education and surrounding municipal communities work hand in hand to generate positive change and build upon each other's accomplishments. At the University at Buffalo, several initiatives presently underway are charged with fostering a similar relationship with the Western New York community.

"Partnership for Progress" is a program created to bridge the gap between the student community of the University at Buffalo and the neighboring municipal communities to assist in developing a harmonious, understanding relationship based on tolerance, good will, individual responsibility, and practical cooperation. This task is accomplished by introducing non-voting student representation to appropriate governing boards in each community, affording local officials and students the opportunity to directly interact and better identify issues of common concern.

Student

Obada Shamaa

Title

Behavioral Consequences of Bronchopulmonary dysplasia and Very Low Birth Weight: 8 Year Old Outcomes

Abstract

There has been increased concern over the reportedly poorer behavioral outcomes reported in children diagnosed with Brochopulmonary dysplasia (BPD) and Very Low Birth Weight (VLBW) at birth. This has implications associated in the child's future in social settings, especially schools, in which a child's behavior effects their interactions with others and their own learning. The objective of this study is to evaluate the behavioral outcomes of a large cohort of children at 8 years.

Three groups of children (BPD, VLBW, and Term) were formed based on gestational age and need for supplemental oxygen at birth. The behaviors of these groups were compared based on standardized parent and teacher assessment outcomes. In addition to these assessments, differences in standardized assessments of intelligence, language, attention, self report, and maternal psychological distress were examined.

Children with BPD were found to be significantly lower in externalizing behavior compared to term children. Maternal psychological state was related to child's behavior, as rated by the parent assessment. Higher Maternal Global Severity Index was related to higher odds for externalizing behavior. There is a trend for children with BPD to exhibit attention problems, although not significant. No effect for BPD on behavior problems, especially internalizing behavior, was found.

*Student***Ruchi Singhal***Faculty Mentors*Dr. Kenneth Takeuchi and
Dr. Susan Udin*Title***Influence of the Nucleus Isthmi
on Retinotectal Transmission***Abstract*

I am studying how visual input influences the formation of axons in the tectum of the *Xenopus laevis*, or African claw-toed frog. The tectum, analogous to the human occipital lobe, is first allowed to receive signals from the outside world as a result of daily sight and living, and is observed through florescence microscopy for axons that came from the nucleus isthmi. The axons that come from the isthmi to the tectum arrive there by processes that are unknown, however once they reach the tectum, they are completely dependent on that visual input that comes from both of the eyes as a result of sight and light from the outside world. It is important to realize that this essential connection is only made if both the eyes are open and normally functioning. If there is a complication during development which prevents axons from leaving the nucleus isthmi properly, there is a small chance that once they reach the tectum they will function properly.

*Student***David Spira***Faculty Mentors*Dr. David Gerber and
Dr. Brian Reynolds*Title***American Mythology: How Early
Comic Books Reflected and
Impacted American Society***Abstract*

Superheroes are the mythology of America. They have become a vessel through which American values and beliefs are passed on from one generation to the next, and are conveyed to the rest of the world.

Characters such as Superman, Wonder Woman, and Captain America are all internationally recognized as symbols of truth, justice, and the American way. The origins of these characters rest in the late 1930s and early 1940s. While World War II was beginning overseas, the first comic book writers and artists, almost all of whom were the children of Jewish immigrants, were creating symbols of hope in form of comic heroes. Taking from what they saw around them in their own

neighborhoods and lives, these heroes reflected the social situation of the time. The nemeses of the heroes were mirror images of the very problems threatening the average American.

*Student***Margaret Starostik***Title***Characterization of Calcium
Binding Proteins in Mouse Taste
Cell Transduction**

*Student is also a participant in the College of Arts and Sciences Program and the Sigma Xi Scientific Research Society. Abstract listed under Sigma Xi.

*Student:***Alex Wallach***Faculty Mentor:***Dr. Stacy Hubbard***Title:***The Lusitania Disaster Portrayed by
the Media***Abstract:*

The sinking of the Lusitania in 1915 marked a turning point in World War I. In the context of the war, the Lusitania became more than a shipwreck; it evoked great national pride and became an important symbol for non-combatants, particularly Americans. To the Americans and her allies, the sinking of the Lusitania confirmed their beliefs in the complete barbarism of Germany and justified the war. To Germans, the Lusitania furthered their mistrust of the British. The media, including newspapers, cartoons, and even art, used the Lusitania to influence public sentiment about the war, and today these allow us to understand how this tragedy was portrayed. Through these representations and misrepresentations the sinking of the Lusitania confirmed everything the Allies and the Germans held true about each other, furthering the web of deceit and mistrust. Examining these documents allows one to understand why so many Americans felt safe on this doomed ship even up to the last minute, and how the Lusitania became such an important symbol afterwards.

*Students***Christopher L. Wirth, Marina
Tsianou, & Paschalis Alexandridis***Department*

Chemical and Biological Engineering

*Title***Kinetic Modulation of Bottom-Up
Gold Nanoparticle Fabrication***Abstract*

Motivated by the potential that gold (Au) nanoparticles have in medical diagnostics and drug delivery, our group has studied an aqueous phase bottom-up gold nanoparticle fabrication method that is spontaneous, stable, environmentally friendly, and quick to completion. The fabrication method has been established in our group's previous work.

BASF's block copolymer, Pluronic(r) (EO_{XX} PO_{XX} EO_{XX}), is employed as the primary gold ion reducing and particle stabilizing agent.

In this study, we introduce to the system an anionic surfactant, Sodium Dodecyl Sulfate (SDS), as a co-stabilizing agent shown to reduce the reaction time period (δ). Further, we have shown that SDS's kinetic enhancement can be mitigated by alpha-Cyclodextrin (aCD) via a SDS-aCD supramolecular inhibition complex. Experimental kinetic data was fit to an empirical model, allowing for quantification of each system's δ .

Thus, the employment of both SDS and aCD allows for modulation of Au nanoparticle fabrication kinetics through non-permanent physiochemical interactions.

**LSAMP (LOUIS STOKES
ALLIANCE FOR MINORITY
PARTICIPATION)***Student***Oluwaseyi Wemimo Akinbode***Faculty Mentor*

Dr. Alexander Cartwright

*Title***Time Resolve Photoluminescence
of ZnO Thin Film, Grown by
Molecular Beam Epitaxy***Abstract*

In this project, two ZnO thin films grown by molecular beam epitaxy (MBE) on sapphire substrates will be studied. The two samples are identical in every aspect except that one has been annealed at 750°C in an oxygen rich environment for one hour. Photoluminescence (PL) and ultra fast time-resolved photoluminescence (TRPL) experiments at various temperatures between 15°K and 300°K will be conducted on these samples. The



temperature dependent measurement of the two samples will be taken and compared to determine if annealing can improve the quality on ZnO thin film grown by MBE.

Student

Mary Akuamoah-Boateng

Faculty Mentor

Dr. Mark Swihart

Title

Efficient Grafting of Multiple Organic Molecules onto Photoluminescent Silicon Nanoparticles

Abstract

Efficient grafting of multiple organic molecules onto photo-luminescent silicon nanoparticles is being investigated. The grafting is enabled by using an etching procedure that leaves a hydrogen terminated surface on free silicon nanoparticles. Multiple molecules can be grafted in series by taking advantage of the residual hydrogen present after initial grafting with a first compound. This allows for further grafting with a second compound. Multiple molecules can also be grafted in parallel by controlling the amounts of substances that compete simultaneously for the surface of particles. Both series and parallel grafting result in particles that have a mixture of two distinct molecules on their surface. As a result, this procedure is expected to 1.) Produce particles with dual dispersibility whereby particles can readily be precipitated out of an organic solvent and dissolved in a buffer solution 2.) Provide multiple functional groups like carboxylic acids for bio-conjugation reactions on the particle surfaces 3.) Produce particles with stable photo-luminescence, at wavelengths spanning the visible spectrum, in polar solvents. The nanoparticles are being characterized using infrared spectroscopy (FTIR), photoluminescence (PL) spectroscopy, transmission electron microscopy (TEM), and nuclear magnetic resonance (NMR) spectroscopy.

*Student is also a participant in the CSTEP Program.

Student

Jarrett Coppin

Faculty Mentor

Dr. Troy Wood

Title

Zinc Deficiency in Superoxide Dismutase and Its Usage as a Biomarker to Diagnose Amyotrophic Lateral Sclerosis.

Abstract

Amyotrophic lateral sclerosis (ALS) is a degenerative neurological disease where the muscles of the body atrophy as voluntary control is lost. About 20% of all familial cases result from a specific genetic defect that leads to mutation of the enzyme known as superoxide dismutase 1. The enzyme contains atoms of Copper and Zinc; past research theorizes that lack of zinc might cause the mutation. Mass spectrometry will be used to test for zinc atoms, concentration of those ions, and other factors that might correlate to the lack of zinc in the protein allowing for faster diagnoses.

Student

Barnard Onyenucheya

Faculty Mentor

Dr. Jennifer Zirnheld

Title

Uses and Progression of Radio Frequency Identification Tags: "Where are we going?"

Abstract

The uses and progression of transmitting information through air has developed over the past century. The phenomenon of transferring information through wireless connections started with Nicola Tesla's vision to send megawatts through the air without wires. This occurrence which seemed far fetched a century ago has now entered the realm of reality with the production of radio frequency identification (RFID) systems. RFID uses radio waves to transmit information. An example of a current application of this technology is E-Z passsm. RFID uses radio waves through the air instead of high voltage transmission lines to transmit power. The RFID tags contain a coil that inductively scavenges from a nearby

RFID reader the energy the tag needs to transmit the data sending milliwatts of power through the air. In this work, I will describe a review of research activities and future trends of RFID technology and its applications as well as possible future endeavors that could be undertaken at the Energy Systems Institute.

Student

Courtney Saenz

Faculty Mentor

Dr. Joseph Gardella

Title

Quantitative Surface Characterization of Hydrogel Using ATR – IR (Attenuated Total Reflection Infrared) Spectroscopy

Abstract

Hydrogels are characterized as cross-linked polymers, in which cross-links are induced by chemical reactions or by radiation. There are several techniques applied to analyze the surfaces of hydrogels, one of which is the attenuated total reflection infrared (ATR-IR) spectroscopy. ATR-IR is capable of identifying and showing how proteins are orientated on the surfaces of various polymers. The purpose of the research is to identify the protein on the surface of the hydrogel (2-Hydroxymethacrylate) and to examine the orientation of the protein on the surface by using ATR-IR, so that scientist can understand the interactions and behavior with the hydrogels environment.

Student

Moses Vaughan

Faculty Mentor

Dr. Bina Ramamurthy

Title

.NET

Abstract

The aim of this research is to understanding the benefits and advantages of Microsoft's .NET Framework and various languages within the .NET Framework. This research will include C++.NET and C#, in the stead of their traditional counterparts, C++ and Java. .NET applications will be

used and applied towards web services development and general application database development. In addition, Macromedia's Flash would be used as a visual aid to present and enhance the graphical illustration of these programs.

SCHOOL OF MANAGEMENT

Students

Kaitlin Andrews, Dennis Beck, Bryan Betz, Jerry Freih, Jason Gleason, Christopher Llop, Sheri TenEyck

Faculty Mentor

Natalie Simpson

Title

Real-time Decision Making in a Simulated Incident Command Post Part I: Designing a Disaster

Abstract

Incident command requires a central decision maker to continually assess conditions and assign resources to resolve emergencies. Simulation exercises allow the study of various tools to assist the incident commander in such settings. However, such simulations require the disaster itself be modeled prior to the exercise, to create a context for the use of such tools. In this project we identify a potential disaster to befall East Aurora, New York; define issues such as its domain and presentation; and explore its potential outcomes, contingent on the decisions of an incident commander. We then create the materials necessary to "reveal" the hypothetical disaster to an actual incident commander and other participants in an interactive "table top" exercise involving officers from the East Aurora Fire Department.

Students

Keith Benkeman, John Coles, Ari Klein, David Lloyd, Lucy Martin, Liz O'Brien, Andrew Slavetskas, Robert Vanwey

Faculty Mentor

Natalie Simpson

Title

Real-time Decision Making in a Simulated Incident Command Post Part II: Capturing, Modeling and Analyzing Radio Traffic

Abstract

During the course of an emergency, an incident commander often makes decisions based on a large set of information continually changing with the progression of the incident. Furthermore, this information is initially delivered as spoken words on one or

more radio frequencies, obligating assistants known as scribes to monitor and capture such transmissions. Scribes then create and update some form of visual summary record for use by the incident commander. In this project, we assist an actual incident commander as scribes, converting the radio traffic associated with a simulation exercise set in East Aurora, New York, into visual records by using both traditional and PC-based tools. We likewise preserve the actual associated radio traffic and other communications in separate digital and audio recordings, to compare the scribes' real-time information models with the factual time line of the simulated disaster.

Student

Cheng-Ting Chen

Faculty Mentor

Minakshi Trivedi

Title

An Empirical Analysis of Consumption Behavior

Abstract

Understanding the consumption patterns in the consumer market with regards to healthy and unhealthy products, is important today when health concerns are becoming more and more prevalent. In this study, using the SUNY Buffalo CRM data base, we formulate an aggregate 'Health Index' for individual census blocks and empirically study the differences in patterns of consumption for several product categories across geographic regions and demographics. Using regression analysis, we find that there are indeed regional and demographic differences in consumption behavior as well as differences across categories so that healthy consumption over one category may not necessarily indicate healthy consumption over all categories. The information derived from such research will be valuable to manufacturers and retailers marketing food and beverages that may have certain health risks associated with it. It will also help policy makers in determining how best to promote products that are 'good for you'.

Students

Kun Pil Cho, Henry King, Steven Lam, Giovanni Li

Faculty Mentor

Rajiv Kishore

Title

Cell Phone Based Payment System as a Replacement of Credit Card Payments: A Radio-Frequency Identification (RFID) Chip Based Solution

Abstract

This creative project conceptualizes and develops models for a new system for payment at retail outlets to replace credit and cash payments using RFID enabled cell phones for credit verification and authorization. The objective of the system is to provide a complete, comprehensive, integrated, high-volume "front end" transactional customer support system. The main business benefit to be obtained from the new system is for mobile phone carriers to advance market share position in the wireless communication industry and the credit card industry. Cell Phone users will have this RFID enabled mobile device that will include a credit card feature (through the RFID chip) where they can use to generate more convenience in today's technological and fast pace environment. The system will enable quicker and easier transactions from credit card authorizations to cell phone carriers to the users of the mobile device.

Benefits:

- Increase revenue through additional RFID feature
- Increase the use of credit rather than stacks of paper money
- Easier tracking records for credit use
- Ability to build better credit over time
- Increase level of customer loyalty through extensive system support of upcoming technology (RFID)

Capabilities:

- Be a high support system with wireless instant transactional information
- Include customer purchase and order tracking through cell phone
- Maintain database and history information to support transaction analysis
- Provide a history of purchase transactions for customer query

Student

Brad Manache, Evan Nemeroff, Justin Pratt

Faculty Mentor

Prasad Balkundi Ph.D.

Title

Too Many Chiefs Spoil the Team? How Former Captains Influence Team Performance in the NHL

Abstract

The purpose of this study is to test whether having more former captains on team will help the overall performance of a team. The sample for this study includes the two hundred and one NHL team captains from 1967 to 1997 and the teams they participated in subsequent to becoming a captain. Team performance, the key dependent variable, was



measured in different ways including the points acquired during the regular season, playoff results, and the overall historical performance of each franchise. Number of former captains was measured by first identifying all NHL captains and then by locating teams that they played subsequently. All the teams had more than one former captain on their rolls for multiple years in the three decades studied. We statistically controlled for both the ex-captains' 1 attributes and teams' characteristics. Preliminary results should be ready by mid April.

Students

Brian Van Buren, Matt Kempster, Eric Jeanmaire, Mike Molea

Faculty Mentor

Rajiv Kishore

Title

Cell Phone Based Payment System as a Replacement of Credit Card Payments: A Cellular Message-Based Solution

Abstract

This creative project conceptualizes and develops models for a new system for payment at retail and web-based outlets to replace credit and cash payments using cellular messaging for credit verification and authorization. Verizon Wireless has a system in place that could easily be adapted to accommodate for a credit ability to be added to their phones. By using special paystations at participating businesses, customers will be able to use a touchpad to dial their phone number. The paystation will lead to a system at Verizon, which will be making the charge to the Verizon account.

The Verizon system will receive the charge, and send a call out to the phone number that was entered. If the phone has the credit ability enabled, they will be prompted with a message requesting them to accept the charges. If they want to accept they will answer yes, and enter their PIN number. A similar system will be in place for web-based retailers, but the user will enter their number in the web form, and there will be a special hardware/software setup that will receive the number from the form and then perform the same actions as the

paystation at a brick and mortar retailer.

Our system would allow customers to activate credit abilities on any of the phones on their account, as well as choose the credit limit from a predetermined range. So, parents could activate credit on their children's phones with a limit of \$50 if they wanted, to give their kids some emergency spending money. Another virtue of our system would be the security it provides over regular credit cards. Having a prompt message sent to your phone means that no one could make charges without having your phone, and since there will be a PIN there will be extra security over and above a signature. If someone steals your credit card, they may still be able to use it to make charges, and if necessary can fake your signature. With our system, even if someone steals your phone, they won't be able to make charges to it since they won't have your phone number. All this is available with the ease of just adding the charge to your Verizon account, without having to deal with the hassle of extra bills.

**RONALD E. MCNAIR
SCHOLARS PROGRAM**

Student

Stacy L. Bender

Faculty Mentors

Brian T. Wymbs, M.A. (Immediate Supervisor) & William E. Pelham Jr., Ph.D. (Supervising Professor)

Title

Does Disruptive Child Behavior Cause Interparental Discord? An Experimental Manipulation

Abstract

Research suggests that a reciprocal relationship exists between interparental conflict and child externalizing behavior. Studies have also shown that parents of attention-deficit/hyperactivity disorder (ADHD) children are more discordant than parents of children without ADHD. However, researchers have not yet determined whether ADHD children cause interparental discord. This study experimentally manipulated child behavior and examined whether parent couples

interacting with a disruptive child are more likely to engage in conflict than parent couples interacting with a well-behaved child. Results indicate that mothers and fathers communicate less supportively and more negatively with each other during and after interacting with a disruptive child.

Student

Katrina Bytschkow

Faculty Mentor

Dr. Jennifer Read

Title

Using a Modified Stroop to Examine Trauma, Posttraumatic Stress, and Alcohol Cognitions: A Pilot Study

Abstract

Using a Modified Stroop to Examine Trauma, Posttraumatic Stress, and Alcohol Cognitions: A Pilot Study
Joseph R. Bardeen¹, Jennifer P. Read¹, John J. Curtin², & Katrina M. Bytschkow¹

¹ State University of New York at Buffalo, Buffalo, NY

² University of Wisconsin at Madison, Madison, WI

Heavy drinking (ALC) is prevalent on U.S. college campuses and college students are at risk for trauma and resulting posttraumatic stress disorder (PTSD). PTSD and ALC commonly co-occur. Social Learning Theory (SLT) suggests that cognitions serve as a critical common pathway to behavioral outcomes (e.g., drinking). As such, close examination of relevant cognitions among those with posttraumatic stress may help to elucidate PTSD-ALC associations. Information processing deficits have been observed in individuals with posttraumatic stress, yet little is known about alcohol information processing among these individuals. In the present study we used the modified Stroop (M-Stroop) to examine cognitive mechanisms by which trauma and PTSD may affect alcohol use in this at-risk group.

Student

Adrienne Curry

Faculty Mentor

Dr. Gretchen Sechrist

*Title***The Influence of Consensus Information on Discrimination***Abstract*

This study explores the influence of consensus information on perceptions of discrimination. Participants were presented with favorable, unfavorable, or no consensus information about individuals' attitudes toward discrimination and then we assessed their perceptions of discrimination. We predicted that participants who received consensus information that the majority of people believed that discrimination should be confronted would be more likely to perceive discrimination than participants who did not receive consensus information or received information that only a minority of people believed that discrimination should be confronted. Contrary to our predictions, we found that providing favorable, unfavorable, or no consensus information was not significant in influencing participants' perceptions of discrimination or influencing their confronting against the discrimination.

This research is important because it examines the effect of social norm information on individuals' perceptions of discrimination.

*Student***Daniel Hatch***Faculty Mentor*

Dr. Gerald Koudelka

*Title***Binding Specificity Determinants of 933W Repressor: Consensus Binding Sites and Binding Affinity.***Abstract*

The developmental decisions of lambdaoid bacteriophages are regulated through two regions of the phage chromosome. These regions, called operator left (OL) and operator right (OR), contain control elements needed for both lytic and lysogenic growth. Lytic growth is characterized through replication and expression of phage genome and reassembly of the virion. Lysogenic growth is characterized as dormant with the exception of the production of repressor protein. The affinity of the repressor for its binding DNA sites within the OR and OL forms part of the molecular switch which determines lytic or lysogenic outcomes. Furthermore, the 933W bacteriophage, which encodes the Shiga toxin, is characteristic of Enterohemorrhagic bacteriophages and is useful as a central

reference strain. The arrangement of binding sites in the phage 933W differs from other lambdaoid phages in that those contain at least three repressor binding sites in the OL region while 933W contains two. To determine the DNA binding mechanism of the repressor protein at this site in the 933W a Bioinformatics/Molecular modeling approach concurrent with a Biochemical/Genetic approach serves to predict the binding mechanism, and confirm or repudiate said prediction, respectively.

*Student***Joanna Rose***Faculty Mentor*

Dr. Leonard J. Simms

*Title***Identifying the Spiritual Personality: An investigation of the relations among religiosity, spirituality, values, and personality.***Abstract*

Through a computerized battery of questionnaires, this study surveyed a sample of 164 undergraduates to investigate the relations between religiosity and spirituality and the respective correlates of each regarding the Five Factor Model of personality and values of individualism, egalitarianism, value-determined restraint, authoritarian acceptance, right-wing authoritarianism, and religious fundamentalism. Measuring religiosity and spirituality was the Assessment of Spirituality and Religious Sentiments, the Intrinsic/Extrinsic Religious Orientation Scale-Revised and four additional questions on religious belief and devotion. Spiritual Transcendence evidenced more highly correlated with Intrinsic rather than Extrinsic religiosity, though consistent with hypotheses, right-wing authoritarianism, religious fundamentalism, and authoritarian acceptance correlated more strongly with religiosity than spirituality. As expected, the FFM yielded relatively low correlations with religiosity and spirituality furthering the argument for measurement of the dimension independent of the FFM. Implications of this research to the measurement of personality are discussed as well as directions for future research

SCHOOL OF PHARMACY & PHARMACEUTICAL SCIENCES*Students***Thu Dung Nguyen, Urvi Telang, Daniel A. Brazeau***Faculty Mentor*

Dr. Marilyn Morris

*Title***Effect of Dietary Phenethyl Isothiocyanate (PEITC) on Hepatic Expression of Drug Metabolism and Toxicity-Related Genes***Abstract*

Purpose: Phenethyl Isothiocyanate (PEITC), a component in cruciferous vegetables, has been shown to reduce the incidence of breast cancer in several studies. This study investigated the effect of PEITC on the expression of genes related to drug metabolism in rat livers.

Methods: Female Sprague Dawley rats received 150 mol/kg PEITC in corn oil or corn oil (controls) orally for a week. RNA was isolated from livers and hepatic gene expression of 288 genes was compared between treatment and controls using an oligoarray from SuperArray. Comparisons were evaluated using unpaired student's t-test.

Results: PEITC treatment significantly up-regulated 7 genes and down-regulated 1 gene. The up-regulated genes included ugt-1a6 (UDP-glucuronyl transferase 1a6), important for the metabolism of estradiol and the detoxification of xenobiotics, and Bc1212, an anti-apoptosis gene. The gene nmmt (nicotinamide N-methyltransferase) was down-regulated; this gene has been reported to be a novel tumor marker.

Conclusions: These changes in gene expression provide insights into the mechanisms of PEITC action in cancer prevention.

Acknowledgements: Supported in part by a Pfizer undergraduate fellowship, an IRDF grant from UB, and NCI R03 CA121404.

*Student***Christine Lee***Faculty Mentor*

Dr. Joseph A. Paladino

*Title***Assessment of Chronic Pain in Long Term Care Facilities: Prevalence, Treatment, and Impact on Daily Life***Abstract*

Objectives: To identify the prevalence of chronic pain in adult residents of a large long-term care facility, to chronicle the treatment regimens, and to assess the effect of chronic pain on the resident's quality-of-life.



Methods: The medical record of each resident was reviewed for inclusion and exclusion criteria. Qualified residents who signed the informed consent were administered a pain questionnaire to establish the presence or absence of chronic pain. A quality-of-life instrument was then administered. **Results:** 96 patients were enrolled; 61 were free of chronic pain as 17 were well controlled on pain medications while 44 patients reported not having chronic pain. 35 residents reported experiencing chronic pain: 15 residents were not receiving any pain medications while 20 residents were seemingly undertreated.

Conclusion: Chronic pain was detected in 37% of subjects. Of these, 43% were not receiving pain medication while 57% reported experiencing chronic pain despite medication.

Students

Hoi Kei Lon and Melanie Felmlee

Faculty Mentor
Dr. Aiming Yu

Title

Sexual Differences in CYP3A4 Induction in Transgenic Mice

Abstract

Purpose: This study was to investigate the impact of xenobiotic receptor activators on cytochrome P450 3A4 (CYP3A4) transgene expression and drug-metabolizing activity in CYP2D6/CYP3A4-transgenic (Tg-CYP2D6/CYP3A4) mice. **Methods:** Tg-CYP2D6/CYP3A4 mice (male and female; 3 and 8 weeks old) were treated with vehicle pregnenolone 16 - carbonitrile (PCN) or 1,4-bis[2-(3,5-dichloropyridyloxy)] benzene (TCPOBOP). Protein expression and drug-metabolizing activity were assessed using immunoblots and CYP3A4 index reactions, respectively. **Results:** Hepatic CYP3A4 expression in transgenic mice was significantly increased by PCN (8 fold) and TCPOBOP (2.5 fold), whereas CYP2D6 was unchanged. Consequently, CYP3A4-mediated midazolam 1'-hydroxylation was 10-fold (PCN) and 3-fold (TCPOBOP) higher than controls. In addition, CYP3A4 drug-metabolizing activities were significantly higher in the

8-week-old female mice treated with PCN and TCPOBOP than corresponding males.

Conclusion: PCN and TCPOBOP induced CYP3A4 expression in a sex dependent manner, suggesting that women may have higher risk of CYP3A4 induction-based drug-drug interactions.

Student

Nathaniel Page

Faculty Mentor

Ho-Leung Fung Ph.D.

Title

Effects of Nitroglycerin on the Gene Expression of Adhesion and Extracellular Matrix Molecules in Human EA.hy926 Endothelial Cells

Abstract

Purpose: To investigate the effects of nitroglycerin (NTG) exposure on the gene expression of adhesion and extracellular matrix molecules in a human vascular endothelial cell line (EA.hy926).

Methods: Confluent EA.hy926 cells were incubated with 0.1mM NTG or vehicle control for 48 hours. Gene expression was monitored by real-time PCR using a commercial available array (Superarray, APH-013). The normalized data were treated statistically.

Results: Among 86 genes screened, incubation with NTG caused a statistically significant downregulation vs. control in the expression of Versican (a large chondroitin sulfate proteoglycan, 50.8%), TIMP-1 (tissue inhibitor of metalloproteinase, 79%), the CD44 antigen (78.5%), and Selectin L (63.9%).

Conclusions: Using a human cell line, we showed that NTG incubation resulted in altered gene expression in several proteins important for plaque development and stability. This observation is consistent with clinical literature suggesting that chronic NTG administration may alter atherosclerotic plaque progression.

Students

Jenna Voellinger and Weiyan Zhang

Faculty Mentor

Dr. Joseph P. Balthasar

Title

The Development of a Chimeric anti-FcRn Monoclonal Antibody

Abstract

Purpose: 1D6 is an anti-human FcRn mouse monoclonal antibody to be used in the treatment of humoral autoimmune diseases. The objective of this project was to develop a mouse-human chimeric derivative of 1D6, to reduce risk for anti-drug immune responses in future clinical evaluations of the antibody.

Methods: 1D6 RNA was isolated, reverse transcribed to cDNA and amplified. DNA was transformed into E. Coli cells. Bacterial plasmids were isolated and digested. Variable region DNA was isolated and then inserted into a pAC-k-CH3 vector. The vector was transformed to E. Coli cells, plasmids were cut, and an agarose gel was run for confirmation. Cotransfection of the vector and linearized baculovirus DNA into SF9 insect cells was done for expression.

Results: Agarose gel electrophoresis showed successful ligation of the variable chains into the pAC-k-CH3 vector.

Conclusions: A chimeric form of the 1D6 antibody was successfully constructed; ongoing work is focused on the optimization of antibody expression.

Acknowledgments: Supported by NIH Grant AI60687.

Student

Stephen Webster

Faculty Mentor

Dr. Curt Haas

Title

Pilot Evaluation of Real-Time Quantitative Polymerase Chain Reaction for the Diagnosis of Catheter-Related Blood Stream Infections in Critically Ill Surgical Patients

Abstract

Objective: To evaluate the potential utility of real-time qPCR for early

diagnosis of catheter-related bloodstream infection (CRBSI) caused by bacteria or fungi of the *Candidagenus*. The objective of this proposal will be met by pursuing the following specific aim: comparing results from 100 sets of real-time qPCR samples to corresponding quantitative blood cultures.

Methods: Comparison of 100 events resulting in the collection of quantitative cultures and samples for qPCR. An event is described as a change in patient clinical condition that is suspicious of CRBSI, prompting the order for quantitative blood cultures. Blood samples will be collected from all catheter ports for quantitative culture and real-time qPCR.

Data Analysis: Analysis based upon the dichotomous variable of positive vs. negative results by culture and qPCR will be evaluated using McNemar's or Cohen's Kappa analysis depending upon the distribution of the data. Additional statistical analyses may be conducted as needed.

Student

Chia-Ching Wu

Faculty Mentors

Dr. Daniel Brazeau &
Robert M. Straubinger

Title

Expression of Vascular Markers in Rat Brain Tumor Cell Lines

Abstract

Tumor blood vessels represent attractive targets in cancer therapy. Our lab discovered that repetitive administration of doxorubicin encapsulated in long-circulating liposomes increases tumor vascular permeability. Our overall aim is to quantify these antivasular effects by measuring treatment-mediated changes in tumor content of blood vessels. Our approach is to use quantitative real-time PCR (qRT-PCR) to measure VE-Cadherin (vascular endothelial growth factor) and PECAM-1 (platelet endothelial cell adhesion), two constitutive markers of vascular endothelial cells. This approach requires that expression of these markers in tumor cells be negligible. Using qRT-PCR, we found that rat 9L brain tumor cells and 9L-EGFP (9L cells constitutively expressing green fluorescent protein) express detectable VE-Cadherin and PECAM-1, but copy numbers are low. Immunofluorescence showed low staining of fixed 9L cells.

These findings suggest that tumor expression of these vascular markers is negligible, but future studies with positive control cells will provide a direct comparison of expression levels.

SCHOOL OF MEDICINE & BIOMEDICAL SCIENCES

Student

Rachael Brust

Faculty Mentors

Dr. Gail Willsky and
Dr. Donald Campbell

Title

Regulation of Kv4.3 Closed-State Inactivation by Extracellular Potassium and Intracellular KChIP2b

Abstract

Rachael D. Brust, Chiemezie C. Amadi, Matthew R. Skerritt, and Donald L. Campbell (authors)

Voltage-sensitive Kv4 potassium channels are highly expressed in the cardiovascular and nervous systems and have been implicated in the regulation of various physiological functions including axonal action potential propagation, somatodendritic interactions, and excitation contraction coupling in cardiac myocytes. It has recently become clear that Kv4 channel inactivation and recovery characteristics are not consistent with classic Shaker (Kv1) N- and P/C-type mechanisms. In particular, Kv4 channels can undergo significant inactivation from pre-activated closed-states (closed-state inactivation, CSI), and Kv4 inactivation and recovery kinetics can be regulated by intracellular KChIP2 isoforms. To gain insights into mechanisms regulating Kv4.3 CSI and recovery, the effects of increasing $[K^+]_o$ from 2 to 98mM in the absence and presence of KChIP2b were analyzed using two electrode voltage clamp. Based on our results, we propose that elevating $[K^+]_o$ slows Kv4.3 recovery by stabilizing inactivated closed-states while KChIP2b accelerates recovery by destabilizing inactivated closed-states.

Student

Martha Clark

Faculty Mentor

Dr. Gail Willsky

Title

Effect of Vanadate, an Anti-diabetic Agent, on Viability and Adhesion in Muscle and Liver Cells

Abstract

Martha A. Clark, Jessica Gupta, Barbara A. Bistram, Rebecca Z. Grayson, Lai-Har Chi, John R. McGrath, and Gail R. Willsky (authors)

Vanadium is a transition metal able to alleviate the symptoms of diabetes. Vanadate, an oxygenated form of vanadium, inhibits cell growth and affects the cytoskeleton. Apoptosis, programmed cell death, is initiated via signal transduction pathways similar to those involved in insulin action. We therefore wanted to determine whether apoptosis is responsible for vanadate-induced cell death. Vanadate caused apoptosis in muscle but not liver cell lines. We also studied the effect of vanadate on cell adhesion because the cytoskeleton is normally involved in this process. Muscle and liver cells were treated with vanadate under non-adhering conditions. The metal was then removed and the cells placed under adhering conditions for the time needed for untreated muscle and liver cells to adhere. The numbers of dead and viable cells in the adhered and non-adhered cell populations were determined. Vanadate incubation inhibited cell adhesion before viability in both muscle and liver cells.

Student

Andrea Donnelly

Faculty Mentor

Dr. Piero Bianco

Title

Rad54: A Recombination Mediator Protein

Abstract

Rad54 is a eukaryotic recombination mediator protein active in all phases of DNA strand exchange, where it stimulates the activity of Rad51. Rad54 is a dsDNA-dependent ATPase that stabilizes Rad51 filaments on DNA, translocates on dsDNA while inducing changes in DNA topology, and displaces nucleosomes.

To understand the mechanism of Rad54, a single molecule study, using dual-optical tweezers, was undertaken. Movies of the protein in action were produced and detailed analysis provided insight into Rad54. These movies show that in the presence of ATP and Mg^{2+} , Rad54 forms a mobile bright spot on the DNA. I then did simultaneous analysis of bright spot position, velocity, fluorescence intensity, size and shape. We concluded that the bright spot



contained Rad54 oligomers. These oligomers produced loops in DNA during rapid and processive translocation producing the bright spots.

Student

Dimitra Ekonomidis

Faculty Mentor

Dr. Kiong Ho

Title

Trypanosoma Brucei Encodes a Bifunctional Capping Enzyme Essential for Parasite Gene Expression

Abstract

The 5' end of eukaryotic messenger RNA is capped to protect messenger RNA from degradation and to promote efficient protein synthesis. We identified an enzyme responsible for cap formation in *Trypanosoma brucei*, a caustic agent for African sleeping sickness. TbCgm1 is a novel bifunctional capping enzyme consists of an amino-terminal guanylyltransferase and a carboxyl-terminal methyltransferase activity. We showed that purified recombinant TbCgm1 react with GTP to form a covalent enzyme-GMP intermediate, and methylates the guanine N-7 position of the GpppN- terminated RNA to form cap structure. TbCgm1 is an essential protein for parasite survival. Genetic knock-down of TbCgm1 by RNA interference lead to an increased level of uncapped RNA. This study will provide valuable insight into the mechanism and evolution of RNA processing events in unicellular eukaryotes and will aid in development of effective drug targets against parasites responsible for a broad range of tropical diseases.

Student

Raed Jaabaji

Faculty Mentor

Dr. Takahiro Tsuchikawa

Title

RPMI 1640 – An Efficient Alternative to Hybridoma-SFM?

Abstract

High Molecular Weight Melanoma

Associated Antigen (HMW-MAA) increases the mobility of melanoma cells and thus increases metastasis. C 21Fc, a HMW-MAA antibody, is expected to lower metastasis, decrease blood flow to cancerous tumors, and, in human subjects, produce antibody dependant cell cytotoxicity. C 21Fc is produced using a myeloma cell line transfected with a plasmid coding for C 21Fc and resistance to Zeocin. The myeloma cell line producing C 21Fc is grown in Hybridoma-Serum Free Medium (Hybridoma-SFM). Hybridoma-SFM is an expensive medium, and thus a less expensive and/or more effective medium would be superior. RPMI 1640 containing the same additives was tested as an alternative. RPMI is readily available, used extensively for the growth of many cell lines and is produced at a relatively low cost. Using flow cytometry, cell ELISA, SDS — PAGE, and western blot, studies have shown that RPMI is effective in the production of C 21Fc.

Student

Ellen Pollack and Asad Rizvi

Faculty Mentor

Dr. Lani J. Burkman

Title

The Effects of Methamphetamine on Male Fertility

Abstract

Our past research has shown that commonly used drugs, including marijuana and nicotine, have had a substantial effect on male fertility. With methamphetamine (MA) abuse increasing to epidemic proportions, both nationally and globally, our lab has opted to study its effects. Thus far we have collected semen samples and performed analyses on a number of MA abusers, suggesting a negative consequence on male fertility. Our project aims to present our current findings.

SCHOOL OF PUBLIC HEALTH & HEALTH RELATED PROFESSIONS

Student

Raymond N. Degli

Faculty Mentor

Michele L. McCarroll, Ph.D.

Title

Application of the Breathlessness, Cough, and Sputum Scale (BCSS) in a pulmonary rehabilitation program.

Abstract

	n	Mean	Std. Deviation
Total BCSS - Entry	35	4.1143	2.92827
Total BCSS - Exit	35	2.6571	2.61155

The prevalence of chronic obstructive pulmonary disease (COPD) has been on the rise is now the fourth leading cause of death in Americans.

Rationale: In pulmonary rehabilitation (PR) there have been effective measures in analyzing a patient's intervention from the day they arrive to the last day they are treated. One of the greatest limitations in PR is the absence of a scale that allows for analysis of a patient's perceived symptoms throughout PR.

Objective: This study used a new measure of evaluating symptoms in patients with COPD: the Breathlessness, Cough and Sputum Scale (BCSS). The BCSS is designed as a daily log where patients are asked to rate the severity of these three symptoms.

Methods: Thirty-five patients with COPD from 3 outpatient PR centers were given the task of keeping a track of their perceived symptoms with the BCSS. RESULTS: Based on these findings, the exercise training and education in PR showed significant decreases (*) in perceived symptoms based on the BCSS. More research is needed to assess symptoms of PR outcomes in order to improve care for this growing COPD population.

Student

Elizabeth G. Rose

Faculty Mentor

Scott C. White, Ph.D.

Title

Effect of prolonged walking with extra weight on strength and limb loading measures.

Abstract

Quadriceps function has been associated with knee OA in the overweight. It has been hypothesized that quadriceps fatigue during walking results in increased joint loads, and greater variability of force magnitudes and rates resulting in cartilage micro-damage. This study measured limb loads and quadriceps strength changes after walking continuously with and without extra weight. Subjects (BMI < 30) walked for 32 minutes on a treadmill and then again with extra mass (BMI > 30). Force (F1) and its rate of rise (F1R) were measured every 8-minutes; quadriceps strength was measured at the beginning and end. F1 and F1R were more variable and the highest F1 peaks occurred for the weighted condition even though normalized to body mass. Variability in loading has been linked to injury. Strength did not change and was unrelated to loading measures. The connection between quadriceps strength, fatigue and OA for the overweight requires further deliberation.

SIGMA XI

Student

David Bapst

Department

Geology

Title

Disparity in Late Ordovician Graptolites

Abstract

While several pelagic graptolite clades were extinguished entirely during the Late Ordovician extinction event, a single group of graptolites survived to diversify in the Lower Silurian. After the extinction event, this new fauna developed a range of novel colony shapes as well as forms that closely resemble those of the extinct clades, suggesting convergent evolution. Specifically, we hypothesize that graptolites surviving the extinction re-radiated and produced a range of morphologies comparable to that existing pre-extinction, in order to

conform to similar planktonic guilds as their extinct predecessors. Measures of disparity (the diversity of morphological form) may be examined by using a set of discrete characters and a dissimilarity metric. Based on this data from species of each of the major graptolite clades, we compare the disparity of Ordovician and Silurian graptolites and test our hypothesis of convergence in form.

*Student is also a participant in the College of Arts and Sciences Program.

Student

Kyle Hacker

Undergraduate student

Department

Biological Sciences

Title

Calcium buffering in taste cells

Abstract

Taste stimuli can activate multiple signaling pathways in taste receptor cells. Some stimuli interact directly with ion channels while other taste stimuli bind to membrane bound G-protein coupled receptors and generate second messengers. Regardless of the signaling mechanism used, the perception of all taste stimuli depend on calcium elevations within the taste cells. Since an increase in calcium is a critical step in taste transduction, its control must be tightly regulated. To date, there has been no characterization of the calcium buffering mechanisms used by taste cells. While multiple calcium buffering mechanisms have been characterized in other cell types, their respective roles in taste cells are currently unknown. Emerging evidence indicates that mitochondria play a critical role in maintaining calcium homeostasis in many cell types. In this study, we are using calcium imaging to characterize the role that mitochondria play in the regulation of stimulus induced calcium elevations in taste receptor cells. We find that mitochondria are critical for the production of normal evoked calcium elevations in response to taste stimuli, regardless of the signaling mechanism used by the taste cell. These data have important implications in our understanding of how taste cells transmit signals to the nervous system as well as how taste signals are formed within taste cells.

*Student is also a participant in the College of Arts and Sciences Program.

Student

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Undergraduate student

Department

Biological Sciences

Title

Characterization of Potassium Dependent Sodium Calcium Exchangers in Taste Receptor Cells

Abstract

Taste perception is a protective mechanism used by the brain to decipher between harmful and helpful substances prior to ingestion. Taste cells present in the oral cavity are responsible for relaying taste stimuli to the nervous system. Taste cells are organized into fungiform, foliate (Fol), and circumvallate (CV) papillae. Within these papillae there are three types of taste cells. Type I taste cells are support cells while Type II taste cells transduce signals via a G-protein coupled receptor pathway that is initiated by bitter, sweet, or umami stimuli. Type III taste cells form chemical synapses with afferent gustatory neurons and are thought to transduce sour and salty stimuli. Since both signaling mechanisms rely on changes in intracellular calcium levels to transduce signals, taste cells must tightly regulate intracellular calcium. In many cells, a key component of calcium regulation is sodium calcium exchange. Na⁺/Ca²⁺ exchangers are a superfamily encoded by 9 different genes divided into 2 groups: Na⁺/Ca²⁺ exchangers (NCX) and the Na⁺/Ca²⁺-K⁺ exchangers (NCKX). NCKX removes excess intracellular calcium by counter transporting 4 sodium ions for 1 calcium and 1 potassium ion. There are 6 known isoforms of NCKXs. NCKX1 plays a large role in calcium homeostasis in the photoreceptors of the retina while NCKX2-4 and NCKX6 are important in the regulation of calcium levels in brain and aorta cells. The functional role for NCKX5 has not been characterized. In this study, we have identified the NCKX isoforms expressed in taste cells and begun characterizing their physiological effects on calcium homeostasis.

*Student is also a participant in the College of Arts and Sciences Program.

*Student*

Margaret Starostik
Undergraduate student

Department

Biological Sciences

Title

Characterization of Calcium Binding Proteins in Mouse Taste Transduction

Abstract

Taste is comprised of five distinct qualities: salty, sour, bitter, sweet, and umami (the detection of amino acids). Taste cells use multiple mechanisms to transduce taste stimuli when activated. Regardless of the transduction pathway being used, all signal transduction depends on increases in intracellular calcium to function normally. As a result, calcium levels must be tightly regulated. While taste cells employ multiple mechanisms to control intracellular calcium, the presence of calcium binding proteins is critical to regulate calcium loads at the stimulus site. Calcium binding proteins function to immobilize free calcium in the cytosol and provide critical regulation of the cytosolic calcium fluctuations. In this study, we have begun characterizing the expression patterns of calcium binding proteins in taste cells.

*Student is also a participant in the College of Arts and Sciences Program and the Sigma Xi Scientific Research Society.

SCHOOL OF NURSING

Student

Azeez Saka

Faculty Mentor

Sherry Pomeroy, Ph.D., RN

Title

Physical Activity of Older Adults in a Long Term Care Setting: Building the Evidence

Abstract

Beechwood Health Care Inc. is implementing a new living environment known as "Welcome Home" that replaces the traditional nursing home in-patient care format to an environment that mirrors living in a home or

"household." The purpose of this funded pilot study is to describe the physical activity and functional performance of residents and analyze differences between the "Welcome Home" group (n = 16) and a matched control group (n = 12) living on traditional units. Accelerometry (ActiGraph), an objective measure of physical activity, and an innovative observational survey measure, the Physical Activity Survey for Long Term Care (PAS-LTC) (Resnick & Galik, 2006), are being used to evaluate physical activity for 48 hours. The Barthel's Index (Mahoney & Barthel, 1982) is being used to evaluate functional performance. Results will be used to design a larger outcomes study to evaluate future resident-centered care "households" and propose interventions to improve physical activity and functional performance outcomes for long term care residents.

Student

Amanda Sattelberg

Faculty Mentor

Janice C. Feienbaum, Ph.D., RN

Title

Parents Pursuing Recovering from Addiction Address Issues of Substance Use and Abuse with Their Children: L Literature Review

*Abstract**Issues*

During the past decade, the importance of parents' roles in preventing their children from using alcohol, nicotine and other drugs has been documented. Additionally, much research has focused on identifying the most effective ways for parents to address issues related to addictions with their children. Meanwhile, parents who are recovering from an addiction to a substance face the critical challenge of how to discuss their own use, abuse, and dependence on substances, while attempting to prevent their children from developing similar problems. Meanwhile, surprisingly little information is available about how the parents' pursuit of recovery from an addiction influences this process.

Description of Project

This project involved a systematic

review of the literature on the topic of parents addressing issues related to addictions with their children, and how this process is influenced by the parents own pursuit of recovery. Documents that focused on parenting, prevention of substance use/abuse, parenting and recovery, and children of parents with an addiction were sought. The materials were accessed via multiple electronic databases. A matrix was used to demonstrate the specific points discussed in each article and to identify if the material actually addressed issues related to parents who are recovering from their own addiction.

Findings

The major finding of this project was a gap in the literature and research on how parents' who are recovering from their own addiction should address issues related to substance use, abuse and addiction with their children. Additionally, the review demonstrated that much of the material available to guide parents on how to address these issues with their children has not been guided by research findings and instead has been based on anecdotal or traditional perspectives of parenting. These findings emphasize the need for nurses to address this significant issue in future research endeavours.

Student

Christina Slota

Faculty Mentor

Mary Ann Jezewski, Ph.D., RN, FAAN

Title

End of Life Wishes During Health Care Proxy Completion

*Abstract**Introduction*

Advance directives are a legally mandated and sanctioned method for people to self-determine their care at the end of life. A health care proxy (HCP) is a document a person can complete that appoints another person to make health care decision for them when they can no longer make decisions for themselves.

Purpose

The purpose of this study was to determine if the person completing the health care proxy communicated with

their appointed proxy person, and what topics were being specifically discussed in reference to end-of-life issues.

Method

This study was conducted using telephone surveys of 206 individuals who had confirmed in the parent study (DHHS/NIH NINR- R21 NR008594A) that they completed a health care proxy form. One hundred fifty-six subjects completed surveys. The quantitative responses were entered into SPSS 14 and analyzed using descriptive statistics. Content analysis was used for the qualitative responses.

Findings

Seventy-four percent of individuals surveyed (n=152) discussed their end-of-life wishes with their appointed proxy at some point. Sixty-one percent of individuals (n=93) had their spouse as their health care proxy.

Ninety-five percent openly discussed what they talked about with their proxy. Common themes of issues discussed included a wish for a Do Not Resuscitate (DNR) order, though the point at which this order would come into play differed among the participants. There were also common phrases used, including but not limited to: "no extraordinary measures," "no machines," "quality of life," and "pull the plug."

Conclusions

Despite the fact that there were reoccurring topics that many of those surveyed referenced, these common themes varied in one major aspect: the context of the situation. It is important that the person completing the health care proxy discuss in detail with their proxy, their end-of-life wishes.

Student

Josh Thomas

Faculty Mentor

Mary Carey, Ph.D., RN

Title

Validation and User Manual Creation for the Super ECG Program

Abstract

Background

SuperECG is a specialized computer software program used by clinical researchers to analyze and interpret raw data from a high resolution 12-lead electrocardiogram (ECG). This software was developed by Mortara Instruments Inc., Milwaukee, WI. Specifically, SuperECG takes an input of raw data captured from a continuous 12-lead Holter recording and converts it into a

spreadsheet with numerous cardiac measures and trends. It is imperative that the software be validated since it is being used for research purposes.

Purpose

The aim of this project is two fold: (1) validate specific cardiac measures against real patient data and (2) create a comprehensive user manual for the operation of SuperECG.

Methods

To accomplish these aims, the SuperECG program will be applied to 30 patients in normal sinus rhythm with continuous 12-lead Holter recordings for a 24 hour period. Specific cardiac measures observed include PR interval, P duration, RR interval, QRS duration, QT interval, and ST elevation at J+60 msec for leads I, II, and V1-V6. These measures will be manually calculated twice at the beginning and end of the monitoring period for each function of SuperECG. If there is a disagreement between the SuperECG's generated measurements versus manual measurements a second opinion will be included.

Conclusions

Results show a strong correlation between manual measurements and computerized measurements made by SuperECG. These results will be included in a comprehensive user manual for SuperECG which will highlight its strengths and limitations in application of electrocardiographic research. Recommendations for future development will subsequently be suggested to the manufacturer of the software.

A GREENER SHADE OF BLUE

Demonstrating Environmental Leadership

UB is deeply committed to environmental stewardship through education, research and civic engagement, UB is a national leader in reducing energy costs, promoting alternative energy sources, and working to abate climate change. This category places a focus on prominent, ongoing efforts of UB undergraduates and faculty mentors who are making our community and our world more environmentally sound.

Student

David Cassel, Brandon Emerson, Josh Hancock, Aaron Lange, Andrew Lloyd, Zachary Miller, Thomas Najuch, Tyler Sweet, Huntington Treadwell

Faculty Mentor

Dr. Alan J. Rabideau

Title

Corn to Ethanol: Is Buffalo's Future Golden?

Abstract

Current US federal policy calls for a rapid and significant increase in the substitution of ethanol for gasoline in domestic motor vehicles. The most common method for producing ethanol is by the fermentation of corn. Proponents of corn-to-ethanol argue that its use will reduce the emission of greenhouse gases and lessen the US reliance on imported oil, while critics have raised questions about the net energy balance, releases of non-greenhouse pollutants, and societal impact of the increased production of corn for fuel. This project examines the feasibility of a corn-to-ethanol facility that has been proposed for the Buffalo waterfront, a location that affords significant advantages in terms of existing grain storage infrastructure and transportation access. Three aspects of corn-to-ethanol production were examined in detail: (1) the life-cycle energy balance of the entire process, (2) the net impact on global warming potential associated with the release of greenhouse gases during fuel production and use, and (3) environmental impacts related to emissions from the proposed Buffalo facility and increased corn agriculture.

Student

Josh Hancock

Faculty Mentor

Dr. James Jensen

Title

Is waste grease produced at UB a suitable Biodiesel feedstock?

Abstract

An analysis was conducted to evaluate the feasibility of converting waste grease generated on the University at Buffalo (UB) campus into high quality biodiesel fuel. The project included an assessment of the available on-campus supply of waste grease and the demand for diesel fuel for vehicles maintained by UB. A bench-scale reactor was fabricated to produce biodiesel, and modified ASTM standard methods were employed to



assess the quality of the feedstock and the finished product.

Student
Nam Le

Faculty Mentor
Debabrata Talukdar

Title
**Solid Waste Management at the “Edge” of “Global Village”:
Insights from the Largest Slum in Africa***

Abstract

Technological and socio-economic trends continue to accelerate the transformation of our world into a “global village.” They have also brought greater awareness of the plight of nearly half of the current world population who live in poverty, over ninety percent of whom live in developing countries with very limited access to basic social and economic amenities. In the interrelated dynamics of a global village, there is a growing recognition that economic and environmental sustainability of all depends on a concerted effort to improve the living conditions of the world’s poor. The new millennium has further instilled a sense of urgency among the international community to address the link between poverty and the environment. One impoverished group singled out for urgent attention is the urban slum dwellers.

In its report, Challenge of Slums, the United Nations (UN) estimates that in 2001, 870 million people in developing countries lived in urban slums. The report also estimates that if current trends continue unchecked, the number of slum residents will grow to approximately 1.43 billion by 2020. At UN-sponsored summits in 2000 and 2002, world leaders agreed to a set of time-bound, measurable, and highly influential development targets—widely known as the Millennium Development Goals. These targets include a commitment to significantly improve, by 2020, the lives of at least 100 million slum dwellers, who are the focus of our research here. Specifically, our research undertakes a systematic empirical study of the slum dwellers in Kenya’s capital

city Nairobi, home of the largest and the poorest slum settlements in Africa, to address the following two primary issues.

First, we focus on gaining an in-depth understanding of just how poor and inadequately served are Nairobi’s slum dwellers. The goal here is to provide hitherto unavailable reliable estimates of their current adverse living circumstances, especially in terms of their local environmental conditions with respect to sewage and solid waste disposal facilities. Second, we investigate the role of several key policy relevant factors in mitigating such circumstances. Of particular interest are the involvements by not-for-profit civic society organizations (e.g., local community based organizations, NGOs) as well as by for-profit private businesses. There has been a growing recognition that private businesses and NGOs could and should play a critical role in helping to improve the living conditions of the poor. Our study presents one of the first systematic analyses of the extent and impact of such role in the lives of some of the poorest of the world’s poor.

The main data for our study come from a recent in-depth personal interview based survey of 1755 households selected through a population-weighted stratified random sampling of about 210,000 households residing in 1283 communities in Nairobi’s slum settlement. The household primary survey data is augmented with interview data of relevant community leaders/elders as well as with secondary data from Kenyan government agencies. The nature of the data allows us to undertake a rigorous analysis that sheds unique insights for public policy makers on the link between poverty and the environment for people living at the “edge of the global village”.

The authors gratefully acknowledge the valuable logistics and financial support for the survey data collection for the research project from the various Kenyan Government agencies and the Africa Infrastructure Division of the World Bank.

Students

**Jonas Locke, Seamus K. O’Connor,
Michael H. Farkas, James O. Berry
& Diana S. Aga**

Title

**Free Drugs in the Environment:
Fate of Veterinary Antibiotics in
Soil and Evidence of Plant Uptake**

Abstract

Fifty million pounds of antibiotics are produced annually in the United States, of which, up to 70 percent are used for livestock production. These antibiotics pass through the livestock largely unaltered, and enter the environment through field application of manure used as fertilizer. Ultimately, antibiotic residues reach ground and surface waters, which has become a concern because of their potential to cause undesirable ecological and human health effects. In particular, constant exposure to low levels of antibiotics can result in the proliferation of antibiotic resistance in the soil microbial flora, which can potentially transfer resistance genes to pathogenic bacteria. Results from our field study on the dissipation of the tetracycline antibiotics in soil using a class-specific enzyme-linked immunosorbent assay (ELISA) for analysis revealed persistence of high levels of “tetracycline-like compounds” in soil. We observed that while a compound-specific analysis using liquid chromatography/mass spectrometry (LC/MS) showed declining tetracycline concentration in surface soil over a period of 16 months, ELISA did not show the same trend. The large differences between ELISA and LC/MS results suggest that some unidentified degradates formed in soil are reacting with the ELISA. Hence, it is entirely possible that there may be numerous unknown tetracycline transformation products in the soil extracts that cause ELISA response to be higher in comparison to the compound-specific LC/MS method. Because tetracyclines are persistent in soil the phytotoxicity of these antibiotics towards two agricultural crops were investigated. In a separate study, we found that tetracycline antibiotics induced the expression of the stress proteins glutathione s-transferases (GST) in corn (*Zea mays* L.) but not in pinto beans (*Phaseolus vulgaris* L.). Laboratory experiments also showed direct evidence of uptake of radiolabelled tetracyclines by the corn plants. These results show

that the occurrence and persistence of veterinary pharmaceuticals in soil may have long-term ecological impacts not only on the soil microorganisms but also on agricultural plants.

Student

Kelly Miller

Faculty Mentor

Dr. James Jensen

Title

Evaluating Turbidity Removal with a Lab-scale Mor-sand Filter Column

Abstract

Water treatment in developing countries can be problematic due to a lack of availability of engineered materials. In addition, environmental engineers are seeking to use renewable materials to create more sustainable treatment processes. Examples of natural and renewable resources are the seeds of the *Moringa oleifera* tree which have coagulant properties.

The present study is being undertaken to determine the effectiveness of turbidity removal by the Mor-Sand filter. The Mor-Sand filter combines the coagulation properties of *Moringa oleifera* seeds with the filtration capacity of a slow sand filter. This technology is being promoted and evaluated in the Niger Delta of Nigeria by the Rural Africa Water Development Project (RAWDP).

A lab-scale filter column was created to simulate the processes of the filter. The filter is layered from the bottom to top with crushed pumice, medium-sized gravel, sand and *Moringa oleifera* paste. Influent and effluent turbidity will be measured in a column set-up with the top layer consisting of *Moringa* paste, nothing, or an inert chemical. Two types of paste will be used: paste with natural oils or paste with natural oils removed.

It is anticipated that the Mor-Sand filter with the paste layer present will be most effective at reducing turbidity. In addition, it is anticipated that paste made from seeds with their oil extracted will be more effective than paste made from seeds without their oil extracted.

Students

Andrew Paluch, William R. Simpson, Jeffrey R. Errington

Title

A Molecular Study of Arctic Mercury Deposition

Abstract

During springtime in the Arctic, it has been observed that atmospheric mercury

is rapidly deposited on snow and ice surfaces. Summer snow melts allow the deposited mercury to readily enter the ecosystem. Among the toxicological effects of mercury are neurological damage, including paralysis, blindness, or insanity; chromosome breakage; and birth defects. Bromine found in arctic snows acts as a chaperone for the deposition of mercury, in a process dependent on the pH of the snow surface.

My current research takes place in two laboratories thousands of miles apart, studying the unique solid-liquid equilibrium of snow. The limitations of experimental methods require a molecular level insight to further understand the snow-air interface. Computational simulations would allow us to understand the interface on a molecular level. This greater understanding would help us to develop a method to limit the problem and alleviate the suffering of many people of the Arctic.

Students

Monica L. Ridgeway, Emily L. Harper, Kathryn M. Whalen,

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Title

The Importance of Regulatory Policy for the Conservation of Vertebrate Fossils and Fossil Sites

Abstract

The conservation of dinosaur bones includes a multi-step process to get specimens from the field to the museum without damage or loss of information. Preparing them for display ensures they will not be damaged, allowing for study and observation by future researchers. While it is important to conserve the bone, it is also critical to regulate the excavation of fossils in general, thus protecting specimens for future studies. Terrestrial fossil specimens, especially large bones, are important in the geological sciences to study earth's history, which demands regulatory policy on the federal, state, and local levels. Regulation of fossil excavation is dependent on where the specimen is found and what type of fossil it is. Federal lands have different sets of laws governing them as opposed to private lands, and different rules are applied to vertebrate and invertebrate fossils. These rules and regulations help to protect fossil rich sites from destruction by development, degradation by the elements and the excessive collection. In May of 2000, the Department of the Interior issued a report on federal fossil

policy. As Secretary Bruce Babbitt is quoted from the subsequent press release: "For the first time our public land management agencies have come forward together with recommendations to stop deterioration and loss of fossils and promote science and education ... Too often, America's fossil treasure chests have been robbed, damaged or neglected because there was no consistent guidance or support for resource managers on the ground. More is needed to protect the best information we have about our deepest past." The policy of fossil and fossil site protection is important for our future studies of paleontology and paleoclimate. Knowledge of the geologic background of the location where a certain specimen was found is critical for the understanding of the geologic history of the specimen. The specimen presented here was found in the Morrison Formation of southeast Wyoming, which is known for its large dinosaur fossils. The removal of the bone from the ground was a three year process from the time it was discovered. The specimen has gone through the process of replacement in which over long periods of time, individual organic particles are replaced by mineral particles. Replacement is an incredibly accurate process; the mineral material left behind is nearly identical in form to the original bone.

Conservation of the bone begins with an organizational approach to remove it from the ground, transport, and the initial cleaning of the specimen. It is essential to keep the pieces arranged in their original positions while removing segments for individual treatment. Pieces were carefully cleaned with lukewarm water to remove sediments and various tools and drills to remove solidified areas of sediment. The gluing process was divided into three stages, using different acetone and epoxy based glues. The final stage of preparing for presentation was to render the bone as it would have looked unbroken and unweathered by painting parts with exposed epoxy resin. The bone will be presented to the UB Geology Department at the end of spring semester 2007, and will be on display within the department.

Summarized exhibit: To add pictures of the bone to the poster, from the conservation stages. The bone would be on display, on a table for viewers, if the space is available.

The poster itself would have more descriptive content to support the abstract.



Student presenters were nominated by their Deans to participate in today's Celebration of Academic Excellence. Each decanal area was asked to go through their own selection process and supply a limited number of undergraduate student works. In limiting the number of student presentations from the various undergraduate schools, a wide variety of scholarly and creative works was able to be showcased. During this poster session we celebrate UB's undergraduate students and their faculty mentors who are engaged in innovative work and scholarly research. The nominated student works you are viewing are stellar examples of the undergraduate research opportunities available to UB students. Thank you for joining us today as we "Celebrate Excellence" in undergraduate research and creative works.