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# PENN STATE BEHREND - SIGMA XI 2008 SEVENTEENTH ANNUAL UNDERGRADUATE STUDENT RESEARCH AND CREATIVE ACCOMPLISHMENT CONFERENCE ABSTRACT BOOK

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## ORAL PRESENTATION ABSTRACTS

### BIOLOGY, ENVIRONMENTAL SCIENCE, AND NEUROSCIENCE

#### The Neuroprotective Effects of Caffeine, Nicotine, and Minocycline against an AF64A Rodent Model of Alzheimer’s Disease

Krystal Baldwin (Jeffrey Cross and Jeffrey Hollerman) Allegheny College - Natural Science, Neuroscience and Psychology

Recent research has shown that there are a variety of drugs that have the potential to prevent symptoms of Alzheimer’s disease (AD). The focus of present research has been on prospective treatments that will maintain memory and learning processes in people afflicted with AD. These treatments can act on the system in a variety of ways including the increase of acetylcholine or reducing the activity of microglia. Caffeine and Nicotine act on the activity of acetylcholine while minocycline is thought to have an affect on microglia. This study (n=20) compared the neuroprotective effects of caffeine, nicotine, and minocycline against a rodent model of AD in tasks involving the following: spatial memory via the Morris Water maze, object preference, and the ability to learn IRT>t schedules by pressing a lever in the operant chamber. The rodents were surgically administered AF64A bilaterally into the nucleus basalis of the brain to create AD-like symptoms. Histology was used to confirm cell death in the brain. The results showed that there were a variety of effects in the study between the AD group and the treatments in the behavioral tasks assessing spatial memory, object preference, and the ability to learn an IRT>15’’ schedule.

#### The Response of Neonate Snapping Turtle (Chelydra serpentina serpentina) to a Moisture Gradient

Melanie Brewer1 (Pamela Silver1 and Jeanette Schnars2), 1Penn State Behrend, School of Science and 2The Pennsylvania State University, School of Forest Resources - Biology

Upon emerging from the nest cavity, turtle hatchlings use a variety of cues to locate water. Freshwater turtles might encounter obstacles when locating a home pond because pond perimeters are often lined with thick vegetation. The objective of this study was to determine the response of neonate snapping turtle hatchlings (*Chelydra serpentina*) to a moisture gradient. Snapping turtle nests were located and excavated at Presque Isle State Park during June 2007. One hundred and ninety four eggs were excavated and incubated at the Tom Ridge Environmental Center. After hatching and complete absorption of the yolk, hatchlings were placed at the midpoint in an enclosed rectangular arena with a controlled moisture gradient on the substrate. In the first experiment, moisture was constant (100% H2O) throughout the arena. Hatchlings did not move in any preferred direction in the arena (p = 0.065). In the second experiment, moisture varied along a gradient from no moisture to high moisture (0 - 40% H2O) along the length of the arena. Hatchlings consistently moved up the moisture gradient (i.e. significantly preferred moist substrate; p = 0.0071). These results suggest that hatchlings use moisture gradients.

### Effects of Culture Parameters on Algal Lipid Production

Ross Hollenbeck (Johnson Olanrewaju), Gannon University, College of Science, Engineering and Health Science - Environmental Science

Concerns for global warming due to increasing greenhouse gas release to the atmosphere and rising cost of crude oil have prompted the exploration of alternative energy sources. Biodiesel production from biomass including algae is among potential alternative energy sources. The primary objectives of this research are to culture algae for biodiesel production using abundant and nutrient-rich wastewater from the Erie Wastewater Treatment plant to

* test the feasibility of *Chlorella* dominance in raw and filtered wastewater;
* to optimize culture parameters: pH, redox potential, lighting requirements (photon) and nutritional supplement as functions of biomass production and lipid contents.

Wastewater is rich in phosphora and nitrogen and heavy metals, excellent nutritional requirements for algae blooms that may result in eutrophication, resulting in severe lakes and streams water quality reduction. *Chlorella* is a hardy indigenous algae species with high affinity for heavy metal absorption and high lipid content yields, fatty acids needed for biodiesel production. This research has the potential of reducing the nutrient levels in lakes and streams as well as providing much needed lipids for biodiesel production.

#### Investigation of the Function of NDP and its Interaction with OHP in Arabidopsis thaliana

Joshua Meyer (Michael Campbell), Penn State Behrend, School of Science - Biology

The function of the gene *NDP* in *Arabidopsis thaliana* is unknown but it was found that this gene overlaps with the sequence for another gene, one helix protein (OHP). Overlapping genes are rare in eukaryotes and should result in overlapping RNA products and inverse interaction of expression. *OHP* encodes for a chloroplast protein associated with the light harvesting system and has been shown to be induced by high light exposure. To discover any RNA level interaction, transcription products of *NDP* and *OHP* were measured over a 24-hour light cycle using quantitative real-time Polymerase Chain Reaction analysis. Results showed varying transcript levels with *OHP* having a greater sensitivity than *NDP* to light exposure during the circadian light cycle. No interaction was seen at the transcript level because both transcripts exhibited light-induced expression. An antibody specific to a peptide region of the *NDP* gene product was developed. Western blot analyses are being preformed to determine the specificity of the antibody to the NDP1 protein.

#### Classification of Alleles of mtSSBP in Human Breast Cancer Samples

Jennifer Montgomery, Jonathan Douds, and Ruth Gonnella (Durwood Ray), Grove City College - Molecular Biology

Prior research has shown that an increase in mitochondrial DNA replication may correlate to an increased risk for breast cancer. Grove City College students discovered a 16-base-pair indel in the promoter region of mtSSBP, leading to the detection of three alleles: homozygous short, homozygous long, and heterozygous. The current study extended this research to identifying a possible link between the possession of a certain allele and an increased risk for breast cancer. Utilizing Polymerase Chain Reaction (PCR) and fluorescent primers, the promoter region of mtSSBP in DNA from breast cancer patients from Texas was amplified. This DNA was then analyzed using Genescan software on an ABI automated DNA analyzer. Examination of the base pair size of the samples led to the classification of each sample’s allele. However, in January of 2008, an additional human genomic sequence was published, demonstrating the presence of a 15-base-pair indel. This recent development suggests that there are more alleles that need to be considered for the classification of the breast cancer DNA.

#### A Comparative Study of the Mycorrhizal Communities of the Lake Erie Bluff Sediments

Nathan Moore (Marlene Cross), Mercyhurst College - Biology

Erosion is a significant problem on the bluffs overlooking Lake Erie. They are subjected to a wide variety of forces, both natural and anthropogenic in nature. One effort to curb bluff recession involves the use of plants to stabilize the soils of the bluffs. This method has had mixed success because plants encounter difficulty establishing in the bluff sediments. Mycorrhizae, a mutualism between fungi and plant roots, may be important in influencing plant survivorship. This study attempted to determine if native mycorrhizal fungi were present in lower, perhaps limiting, amounts in the two bluff sediment types (grey and red) when compared to bluff-top soils. To compare the mycorrhizal inoculum naturally present in the sediments with bluff-top soils, a trap crop was inoculated with each of the three distinct soil/sediment types found at the bluffs. It was hypothesized that the grey bluff would have fewer naturally-occurring mycorrhizal fungi present than the other soil types since few plants survive there. Preliminary results show no significant difference in the quantity of mycorrhizal inoculum present in the three discrete soil/sediment types. The level of mycorrhizal inoculum does not appear to play the major role in plant survivorship in this ecosystem.

#### 2,4-Diacetylphloroglucinol, a Secondary Metabolite of Pseudomonas fluorescens, Does Not Affect Auxin-Inducible Genes

Emily Pfeufer (Catharina Coenen), Allegheny College - Biology

*Pseudomonas fluorescens* is a rhizobacterium well-known for its biocontrol ability, presumably as a result of its biosynthesis of a wide variety of secondary metabolites. The bacterium can produce hydrogen cyanide (HCN), the antibiotics 2,4-diacetylphloroglucinol (DAPG), pyoluteorin, and pyrrolnitrin, as well as the siderophores pyoverdine and pyochelin. The effects of the sequenced *P. fluorescens* strain, Pf-5, and *phlD-,* its DAPG mutant, were investigated on the auxin-inducible GH3::Luciferase promoter::reporter system in transgenic tobacco. Results suggest DAPG does not cause the inactivation of auxin-inducible genes, but it was also found that both bacterial strains were producing HCN. Although DAPG is a known antibiotic that is toxic to a number of soil organisms, a different *P. fluorescens* component is harming the responsiveness of auxin-inducible genes.

#### Analysis of Global Gene Expression Changes in Potato Meristems Treated with Bromoethane

Erika Segear and Lee Beers (Michael Campbell), Penn State Behrend, School of Science - Biology

The potato has for a long time been a staple food, with human consumption counting for 50-60 percent of potato production. Unfortunately, potatoes are best grown in moderate climates, making cultivation throughout the year impossible and storage essential. It is difficult to characterize the specific genes associated with dormancy and sprouting because the breakage of dormancy varies greatly in potatoes. Treatment with bromoethane (BE) can shorten dormancy, creating a compressed and synchronized period of dormancy. This allows the progression of dormancy to be followed experimentally and may lead to a better understanding of this complex developmental process. In this experiment, dormancy cessation was allowed to progress normally or was chemically induced using bromoethane (BE). Microarray analysis was used to compare normal dormancy cessation to BE-induced dormancy cessation, revealing similar up and down regulated transcripts. Many of transcripts that decrease as dormancy terminates are inducible by abscisic acid, particularly in the conserved BURP domain proteins. These include the RD22 class of proteins and the storage protein, patatin. Transcripts associated with an increase in expression encoded for proteins in the oxoglutarate dependent oxygenase family. The results show that BE induced cessation of dormancy initiates transcript profiles similar to the natural process.

### CHEMISTRY

#### Characterization of Titanium DiOxide Nanoparticles

Dave Bowers, Jennifer Pezdec, and Ryan Stotka (Carl Hultman), Gannon University, College of Science, Engineering and Health Science - Chemistry

Titanium dioxide nanoparticles synthesized using the following reaction scheme

TiF4 + SiO2 -----à TiO2(s) + SiF4(g)

are being characterized using IR spectroscopy, optical microscopy, scanning electron microscopy, and computational chemistry. Diatoms are also being used in place of SiO2 in the reaction with the hope that the diatom nanostructure details will stay intact when TiO2 replaces the SiO2 in the diatoms. The characterization results will be used in conjunction with varying reaction conditions in order to gain control of particle size and reaction yields.

#### Synthesis of Titanium DiOxide Nanoparticles

William Boyle, Cody Hodgdon, and Dominic Loiacona (Carl Hultman), Gannon University, College of Science, Engineering and Health Science - Chemistry

Titanium dioxide, along with other metal oxides, are being synthesized using the following reaction scheme

TiF4 + SiO2 -----à TiO2(s) + SiF4(g)

The reaction is run in different solvents using a range of temperatures and concentrations of chemicals. The Titanium dioxide particles formed are perfect cubes with sides ranging from 100 to 150 nm. Reaction conditions are being studied in order to learn how to control the size of the nanoparticles and reaction yields. Reaction byproducts are also being studied.

#### Revolutionizing Magnetorheological Suspensions: Exploration of Particle Shape and Aspect Ratio Dependence

Joshua Karli, Jeffrey Krug, and Joseph Filer II (Richard Bell), Penn State Altoona - Chemistry

Conventional magnetorheological (MR) fluids are smart fluids whose viscosity can be controlled continuously, ranging from the liquid to semisolid regions, by the absence and application of a magnetic field. MR fluids are used for magnetic clutches and dampers for vehicles, human prosthetics, haptic devices, and more. Hindrances to further applications of these fluids are primarily related to apparent yield stress (“strength” of the fluid in the semisolid state) and the rate and extent of particle sedimentation. Conventional fluids contain spherical particles in the range of 1-10 µm suspended in a carrier fluid; larger diameter spheres allow higher yield stresses but settle faster, while smaller spheres allow a slower sedimentation rate but lower yield stress. We have generated wire-based fluids that contain 322 nm diameter ferromagnetic wires with discrete lengths ranging from 3.3 to 24.8 µm suspended in silicone oil. The apparent yield stress of these fluids is shown to increase with wire length. We have also introduced this particle geometry into conventional MR fluids, yielding a novel “dimorphic” suspension containing both spherical and rod-shaped particles. These fluids display an increase in the apparent yield stress with greatly improved sedimentation properties, thus opening the door for a variety of new applications.

#### Synthesis of Isoflavones from 2-Hydroxychalcones Using 1H-1-Hydroxy-5-Methyl-1,2,3-Benziodoxathiole 3,3-Dioxide

Alyssa Zimmerman (Michael Justik), Penn State Behrend, School of Science - Chemistry

Few synthetic methods give direct entry into isoflavones, compounds that serve as potent anti-oxidants, phytoestrogens and used in prevention and treatment of carcinomas, which do not rely on toxic heavy metal oxidants. In this research, direct synthesis of isoflavones from the oxidative rearrangement of 2-hydroxychalcones by 1*H*-1-hydroxy-1,2,3-benziodoxathiole 3,3-dioxide (HMBI) was achieved. While the structure of HMBI is analogous to [hydroxy(tosyloxy)iodo]benzene, a mild oxidant used in organic synthesis, HMBI can be quantitatively recovered, recycled, and re-used. In this investigation various 2-hydroxychalcones were converted in moderate to high yields to isoflavones in methanol with various activating or deactivating *ortho-para* directing substituents. In a typical experiment a methanolic solution of a substituted 2-hydroxychalcone was treated with two equivalents of HMBI and heated under reflux for 24-48 hours. The reduced reagent is easily removed from the reaction mixture by liquid-liquid extraction and can subsequently be recycled and reused. The isoflavones were isolated in high purity followed by recrystallization or preparative thin layer chromatography. From this study several conclusions can be drawn to suggest a plausible mechanism. However, at this juncture it is unclear whether the oxidative rearrangement occurs through the starting 2-hydroxychalcone or of the flavanone derived from it under the reaction conditions.

### COMPUTER INFORMATION SYSTEMS AND COMPUTER SCIENCE

#### The Effect of Type and Timing of Interruptions on Resumption Lag

Chris Dymond and Will Maxwell (Terri Lenox), Westminster College - Computer Information Systems

Interruptions while using computers are inevitable and disruptive. Our study examines the effect of such interruptions on an individual while he/she is performing an intellective task, where we define an intellective task as one which has a correct answer. Both the timing of the interruption and the type of interruption (e-mail and instant message) will be studied and analyzed using an analysis of variance (ANOVA) test. While others have studied these components individually we will be examining these effects together. One would want to determine the effect of a particular type of interruption and its time of occurrence in order to minimize the resumption lag involved with it. Resumption lag for our purpose is the amount of time that passes from the receipt of an interruption to the time a subject resumes working. Results of tests on approximately 60 college-age subjects will be reported.

#### Intelligent Risk Agent Using an Artificial Neural Network and Temporal Difference Learning

Mark Gordon and Justin Sedlak (John Bonomo), Westminster College - Computer Science

The Temporal Difference Method (TD) is a training method for Artificial Neural Networks (ANNs) and has been used to create many top level game playing agents, most notably in Backgammon. Our project was to use TD learning to create a competitive agent for the board game of Risk. Unlike other TD learning agents, this agent does not input the full board; instead the inputs are a set of key evaluations of the board. These evaluations are used to train the ANN over thousands of iterations. Our program then uses the output of the ANN, which is an evaluation of any given game state, to assist it in making in game decisions.

#### Amorphous Systems Modeling

Alicia Klinvex (Blair Tuttle, Ronald McCarty, and Gary Walker), Penn State Behrend, School of Science - Computer Science

Amorphous silicon (a-Si) is a material used in many technological devices, such as transistors and solar cells. Models of a-Si would therefore be very useful to the scientific community. They would allow physicists to study the formation of defects in solar cells and various other microscopic phenomena. As a result, I developed a program that generates models of materials like a-Si in order to enhance our understanding of their properties.

#### Computational Science: A Multidisciplinary Research Tool

Dennis Paskorz Jr., Paul Fontecchio, and Alex Mooney (Bruce Wittmershaus), Penn State Behrend, School of Science - Computer Science

Computational science is the integration of mathematical science, computer science, and any science of the researcher’s choosing. I have applied this multidisciplinary approach with respect to biological process modeling, bioinformatics, and experimental physics modeling. This approach showed its usefulness when I attempted to model capillaries within a tumor and soon found out creativity is the driving force behind this kind of work. My bioinformatics project requires organizing and comparing very large sets of genetic data in a way that that leaves unique genes only. I am also testing and extending the modeling capability of a program written by Alex Mooney which models light collection in a luminescent solar concentrator (LSC). An LSC is a fluorescent plate of plastic that “concentrates” fluorescence to solar cells at the edges of the plate where it is converted into electrical energy. The LSC is cheaper to use for large area collection in comparison to purely using solar cells. If reflective white material is placed behind the LSC, sunlight that is not absorbed the first time through the plate will reflect back up into the LSC creating another opportunity for absorption. My goal is to use a Monte-Carlo modeling program to deduce whether output gains for costly, high-reflectivity white materials are worth the cost opposed to generic, less-reflective material.

#### NURBS Curve Interpolation of Artistic Data

Andy Polack (John Bonomo), Westminster College - Computer Science

Non-Uniform Rational Basis Spline (NURBS) curves and surfaces have been used in the Computer-Aided Design (CAD) industry since the early 1970s. Pixar’s first major blockbuster, Toy Story, utilized NURBS to model all of the characters in the movie. While they are clearly highly powerful and expressive constructs, NURBS also are limited in some ways. The most pertinent limitation is that NURBS are an approximate technique which does not guarantee interpolation of a fixed number of data points. This makes converting polygon-specified artistic data into a set of NURBS curves and surfaces very difficult. Typically, NURBS are generated by artists using programs to manipulate the placement of the *control points* needed to specify the curves and surfaces. There are many existing artistic models which are not specified as a NURBS. How could one convert such a model (automatically, without human intervention) into a NURBS surface? I will explore one such answer to this question by exploring a method of determining a NURBS curve from previously specified discrete artistic data via the analysis of mathematical curvature.

#### A Simple Tiling Window Manager

Vincent Povirk (Gary Walker and Meng Su), Penn State Behrend, School of Science - Computer Science

A window manager is a component of a graphical environment that allows users to control the size and location of windows, close windows, and decide which window has the focus. Most modern window managers assign each window an independent size and location. This kind of system does little to assist users in positioning windows conveniently. Tiling window managers can make some tasks easier by ensuring that visible windows fill the available space and do not overlap, but they are rarely used today. Existing tiling window managers suffer because they either force users to learn too many options and commands or provide very little flexibility. I am building a tiling window manager for Linux that provides only two operations for manipulating layouts: split and resize. Splitting cuts a window's space in half, using one of the halves to display another window. Resizing moves a window's border and makes limited adjustments to the rest of the layout. Using only these two commands, it is possible to create any layout that meets the tiling constraint. This project will provide a viable alternative to traditional systems for people who would not otherwise find a tiling window manager useful.

#### Consistent Pseudorandom Objective-Based Level Design for Games Having Minimal Environment Data in Hard Disk Space

Jacob Romigh (John Bonomo), Westminster College - Computer Science

Video games are progressing faster than ever. In a few decades, games have come from 8 KB on the Atari 2600 external cartridge to the 50 GB Blu-Ray Disk on the Playstation 3 with the internal 80 GB hard drive. With this increase in storage space, the idea of conserving hard space for the maximum amount of gameplay to fix on to a limited medium is disappearing, though procedurally generated content is coming back into style with titles like *Nethack*, *Izuna: Legend of the Unemployed Ninja*, and Will Wright’s upcoming *Spore*. The design of this study was to research how much space would be needed to generate a simple adventure game’s level layout, which includes procedurally generating multiple objective paths and rooms across many stories in a multistoried environment.

### BUSINESS

#### A Change in the Airline Industry: Customer Service and September 11, 2001

Melanie Brewer (David Causgrove), Penn State Behrend, Sam and Irene Black School of Business - Marketing

Seventy-three percent of Americans prefer to fly over any other type of long distance transportation. However, even with such a large market, customer service rating is down to a staggering 47 percent in 2006 from 89 percent in 2001. The objective of this study was to explain this 42 percent drop. Surveys were taken at Pittsburgh International, Buffalo Niagara International, Erie International, and Cleveland-Hopkins International airports. Surveys were given to all willing participants in the baggage claim area, after the flight was complete.

#### Motivations of Student Social Gamblers

Kevin Brown, Renee Staul, Erin Nussbaum, and Tyler Tyzinski (Syed Andaleeb), Penn State Behrend, Sam and Irene Black School of Business - Marketing

Due to the recent construction of Presque Isle Downs in Erie, Pennsylvania, a study was conducted to explore the factors that motivated Behrend students to be social gamblers. Secondary research conducted showed that a high percentage of college students had gambling problems, and this research was completed to uncover the motivations of students to gamble socially. Questionnaires were designed and distributed, in high traffic areas on campus, using a systematic sampling technique. The constructs measured in the questionnaires included satisfaction, awareness, demographics, lifestyles/ opinions, attitudes, and frequency of gambling. Conclusions derived from the results were that income does not affect a student’s likelihood to gamble, students gamble more for intrinsic rather than extrinsic factors, and students associate social gambling with more advantages than disadvantages. These conclusions did not support the results from the secondary research but rather added to the list of reasons why students socially gamble.

#### Mobile RFID Devices in the Retail Industry

Paul DeWolf (Frank DeWolf), Penn State Behrend, Sam and Irene Black School of Business - Management Information Systems

The purpose of this research was to identify mobile application best practices, identify mobile application trends, and identify future research opportunities. Given the findings of the applied research, the use of Radio Frequency Identification Device (RFID) technology integrated with mobile devices provides a ubiquitous solution for both consumers and retailers. Consumer electronic tools, such as cell phones, offer the opportunity to provide faster and more accurate forms of payment and an improved shopping experience. By using this technology, costs and hassles associated with purchases are decreased for both customers and retailers. ABI Research recently published a report predicting that, within five years, 50 percent of cell phones will include RFID chips and use Near Field Communication (NFC). Additional research has shown that global applications utilizing RFID-enabled cell phones are increasing. For example, a McDonalds located in South Korea implemented a new ordering process using RFID. As cell phones are becoming increasingly dominant, they are being used to send electronic coupons and pay for purchases. The results of this research led to the conclusion that it is vital for industry leaders to research new applications and explore future benefits derived from these advanced capabilities.

#### What Causes Brownfields?

William McAndrew (James Kurre), Penn State Behrend, Sam and Irene Black School of Business - Business Economics

This paper attempts to explain the factors associated with environmentally challenged lands: what causes brownfields and why? It is hypothesized that brownfields evolve from the presence of selected industries, especially certain manufacturing industries, and that identification of these activities may help in the identification of as-yet unreported brownfield sites. Using federal government data on brownfields by state, several sets of independent variables were tested as explanatory variables using regression analysis. These explanatory variables focus on past activity in each state of various industries using measures such as GDP produced by, and number of establishments in selected industries. The paper tests several models, using alternate measures of brownfield presence in each state and different specifications of the independent variables. The paper finds that states with higher amounts of activity in 1970 in the chemical, fabricated metal, and education industries tend to also have more brownfields per capita. A second model focuses on changes in the number of establishments in an industry since 1970, based on the idea that industrial closures in selected industries may have led to the existence of brownfields. Again the chemical and education industries were significant explanatory variables.

#### Prevalent Factors Affecting Satisfaction and Student Retention at Penn State Erie

John Tarasi, Brandon Eckstrom, Steve Pettys, Craig Schwabenbauer, and Eric Strawn (Syed Andaleeb), Penn State Behrend, Sam and Irene Black School of Business - Marketing

Current trends indicate student retention challenges at many colleges. Given this problem, a research study was formed with the purpose of determining factors that contribute to student loss at Penn State Behrend. Factors were determined through background research to provide a basis for survey questions. These questions covered a broad range of Penn State Behrend attributes that lead to explanation of the dependent variable, student satisfaction. The survey was then randomly distributed to 300 current students at Penn State Behrend. Data analysis provided prevailing factors that led to student satisfaction: area attractions, area transportation, small class sizes, knowledgeable faculty, and Penn State unity. Results were examined by high and low means to determine positive or negative feelings about a variable. Low-rated factors included area attractions, area transportation, and Penn State unity, indicating that these areas need to be improved upon. High-rated areas included small class sizes and knowledgeable faculty, indicating strengths that need to be maintained.

### ENGINEERING

#### Implementing the EPCglobal Network Using Open Source Software

Brian Auth1 (Frank DeWolf2), Penn State Behrend, 1School of Engineering and 2Sam and Irene Black School of Business - Software Engineering

This research consisted of implementing Radio Frequency Technology (RFID) technology with the EPCglobal network, using open source software. EPCglobal is the organization responsible for developing standards for Electronic Product Codes (EPC) simplifying the use of RFID. They use an EPC Information Service (EPCIS), which is a set of standards allowing businesses to share data among each other. It is important to implement the EPCglobal network with open source software, because of the emergence of EPCIS and its use in the supply chain. This means that RFID is becoming a more popular way to share data among businesses, and a less expensive solution is needed. The problem with RFID is that businesses do not want to invest in the implementation without seeing how it works. The result of this research shows how it is possible to implement the EPCglobal network with little to no cost.

#### Development of a Simple Tank Experiment to Illustrate Core Principles of Hydrostatics

Brian Benini (Robert Edwards), Penn State Behrend, School of Engineering - Mechanical Engineering Technology

All Mechanical Engineering and Mechanical Engineering Technology programs have a requirement for coursework in fluid mechanics. A fundamental principle of fluid mechanics is hydrostatic pressure. Hydrostatics says that the pressure at some depth of fluid depends only on the depth of the fluid and its density. This relationship is shown in the hydrostatic equation: P=h or gh. It is a simple concept, but not intuitive for all students. Students will often assume that the pressure depends on the volume of the fluid in the container, not the depth. For this project two tanks were designed, built, and tested to demonstrate how the hydrostatic equation works; one with a constant diameter and one with a change in diameter along the height. Pressure is measured at the bottom of each tank as they are filled with water. A data acquisition unit is used to collect and record pressure values. After seeing the results from the uniform tank, students make a prediction on what will happen in the stepped tank experiment. Students will make predictions before the theory has been presented. They will then be given an extensive exercise while using the same tank experiment and demonstrate hydrostatic principles themselves.

#### A Comparability Study of an Electret Accelerometer to a Traditional Piezoelectric Accelerometer

Joshua Jones, Wesley Salandro, and Timothy McNeal (John Roth), Penn State Behrend, School of Engineering - Mechanical Engineering

Traditional piezoelectric accelerometers and data acquisition (DAQ) components that are used for monitoring a machine’s condition can be expensive and difficult to use under most industrial conditions. The goal of the research discussed herein was to experimentally test a significantly cheaper electret accelerometer that can perform the same tasks as the piezoelectric accelerometer. The electret accelerometer, a recently developed sensor, is a very low cost product which is believed to be capable of machine-condition monitoring. The data from the electret accelerometer is read using the sound card on any PC. These data will be compared to data obtained from a traditional piezoelectric accelerometers and DAQ. The reliability of the electret accelerometer will be based on whether the electret accelerometer can produce similar responses to the piezoelectric accelerometer while in different temperature environments. The thermal testing will consist of a comparison of electret and piezoelectric accelerometer outputs from a specific “sine sweep” program at temperatures varying from approximately 70 °F to 170 °F. This research will also determine if the electret accelerometer is unidirectional. This test will provide valuable information to decide if the electret accelerometer can be used to monitor tri-axial situations.

#### Wireless Machine Tool Monitoring

Timothy McNeal, Wesley Salandro, and Joshua Jones (John Roth), Penn State Behrend, School of Engineering - Mechanical Engineering

Knowing the current state of wear on any tool used in a machining process can be vital information. Piezoelectric accelerometers and force dynamometers have been proven effective tools in predicting tool wear and failure. These forms of monitoring can be very expensive and require specialized data acquisition. This research is aimed at using an electret accelerometer, a recently developed sensor, to perform the tasks of tool wear and failure predictions. The electret accelerometer, a Hosiden #KUB2823 electret, will be coupled with a bluetooth transmitter for the purpose of wirelessly monitoring the tool. This will allow for any PC with a sound card and bluetooth capabilities to monitor tool wear. Testing will be completed in conjunction with the University of New Hampshire on a CNC lathe and CNC milling machine. Unlike previous methods of receiving data through slip rings, the electret accelerometers can be mounted directly to the tool. With the addition of the bluetooth transmitter these data can be directly recorded from moving components. It is expected that this cost effective and industrial-friendly electret accelerometer will be able to predict tool failure comparable to traditional monitoring methods.

#### Effect of Electric Pulsing on Various Heat Treatments of 5XXX Series Aluminum Alloys

Wesley Salandro, Joshua Jones, and Timothy McNeal (John Roth), Penn State Behrend,

School of Engineering - Mechanical Engineering

Previous studies have shown that the presence of a pulsed electric current in an aluminum specimen during the deformation process can significantly improve the formability of the aluminum without heating the metal above its maximum operating temperature range. This research investigates this claim by examining the effect specific electric pulsing has on 5052 and 5083 Aluminum Alloys. Two different parameter sets were used while pulsing the three different heat treatments (as is, 398 °C, and 520 °C) for each of the two aluminum alloys. The electric pulsing was applied to the aluminum while the specimens were deformed, without halting the deformation process. Analysis will also be conducted to establish the effect the electric pulsing had on the aluminum alloy’s heat treatments. The results from this research show and that pulsing results in significant elongation beyond baseline tests (with no electric pulsing), while also significantly reducing the engineering stress in the material as well. This method of aluminum deformation proves to be more efficient than traditional methods due to the fact that the deformation process is never interrupted. With greater elongation and lower stress, aluminum can be deformed quicker, easier, and to a greater extent than currently possible.

### ENGLISH

#### Masochistic Elements of the Sublime

Elizabeth Twohig (Cathy Schlund-Vials, Gregory Morris, and Craig Warren), Penn State Behrend, School of Humanities and Social Sciences - English

The sublime has a great history behind it, yet one tarnished by a rejection of beauty and the feminine. I will discuss some of the aspects that have caused this perception by connecting similar elements of masochism to those that have made the sublime both appealing and fearful.

### HISTORY

#### Immigration, the Politics of Identity, and Germanophobia: Ernst Behrend and the Alien Property Custodian

Chris Groesch (John Rossi), Penn State Behrend, School of Humanities and Social Sciences -History

Hammermill Paper Company was confiscated from its owner, Ernst Behrend, in 1919 by the U.S. Government as part of an effort to destroy the perceived German industrial monster operating in America at that time. Behrend, a co-founder of Erie’s Hammermill Paper Company, was a German immigrant who became an American citizen in 1901. In 1916 Behrend arranged the purchase of Hammermill Paper Company from Varziner Papier Fabrik, the German paper syndicate which had owned the controlling share of the company since its founding in 1898. In 1917 the United States entered WWI. That same year Congress passed the “Trading with the Enemy Act,” legislation which empowered the President to confiscate and liquidate enemy held assets in America. President Woodrow Wilson thus issued Executive Order 9095, creating the Office of the Alien Property Custodian whose duty was the seizure of property from companies it perceived to be in league with the Central Powers. Behrend’s defense of his company during the Alien Property Custodian hearings of 1919 provides a narrative exemplary of turn of the century struggles in the political identities of American immigrants, and the influence of Germanophobia on post WWI American politics.

#### Philip R. Faymonville and the Lend-Lease Mission to the Soviet Union

Sabina Medilovic (John Rossi), Penn State Behrend, School of Humanities and Social Sciences - History

Amidst all the turmoil of World War II, Army Chief of Staff George C. Marshall requested the Director of the FBI, J. Edgar Hoover, to investigate Philip R. Faymonville, administrator of the Lend-Lease program to the Soviet Union. The reason for the investigation was the allegation of Faymonville being homosexual and the implication that because of his alleged sexual preference he was an easy blackmail target for the Soviets because they could force him to give up military secrets. During the course of FBI investigation, numerous informants based their affirmation of Faymonville’s homosexuality on his physical mannerisms, calling him a “sissy,” and his lack of enjoyment for sports such as football and baseball. Additionally, his enjoyment of music and his visitation of theatres made him absolutely suspect in the minds of the informants and the FBI investigators. This paper contends that understanding Faymonville’s personality, the conditions and people he worked with will make it evident that the investigation was completely conducted based on the flimsy accusations of informants that were entangled in a political struggle with Faymonville. Faymonville’s political rivals in the American Embassy used these homosexual allegations to gain power within the State Department and the White House.

### MATHEMATICS

#### The Game of Go and Surreal Analysis

Joseph Pleso (Paul Olson), Penn State Behrend, School of Science - Mathematics

The focus of this research was the application of surreal analysis to the game of Go. Surreal numbers are a superset of real numbers, and can be explained through the use of sequences of trees. The game of Go is a two- player board game, where the object is to capture the most territory. The motivation for this research was the lack of a superior computer algorithm to play the game. Our approach utilizes theories from surreal analysis to decompose the board into smaller boards to simplify the analysis. Using this technique allows a larger class of positions to be analyzed. It is believed that with a better understanding of more positions, a more advanced artificial intelligence (AI) can be constructed. The results of this technique will be presented and explained.

#### Entrainment Ranges for a Coupled-Oscillator Model of the Sea Lamprey

Casey Robinson (Joseph Previte), Penn State Behrend, School of Science - Mathematics

In this project, a chain of differential equations is used to model the electrical activity in a sea lamprey spinal cord. The model is periodically forced at various points with varying strengths and frequencies, and the response is measured. In particular, the model predicts which frequencies and strengths that the lamprey will be able to synchronize with the forcing. Results are compared with an experimental lab at the University of Maryland that actually forces a lamprey with different strengths and frequencies.

#### Adding a Random Walk in Carrying Capacity and Growth Rate to a Surplus Production Model

Kyle White (Michael Rutter), Penn State Behrend, School of Science - Mathematics

Pacific halibut are large flatfish weighing up to 500 pounds and a highly important commercial fishing industry. Currently the International Pacific Halibut Commission (IPHC) regulates halibut fishing levels in six regions of the Northern Pacific Ocean. The IPHC collected 29 years of fishing data in an attempt to model and regulate halibut populations. We considered a difference equation model to predict commercial harvest based on biomass surplus production. The model initially contained four parameters for each of the six regions: initial biomass, the growth rate, the carrying capacity, and the catchability (how effective the gear is for catching halibut). Maximum likelihood techniques were used to fit each of the six regions simultaneously, comparing observed and predicted harvests. We will attempt to improve upon this model by relaxing the assumptions that the growth rate and carrying capacity are constant, and adding bounded random walks to these parameters. We will then be able to explore possible correlations in the random walks, and assess the uncertainty in our parameter estimates with Markov chain Monte Carlo (MCMC) methods.

### POLITICAL SCIENCE

#### The Laterality of Treaties: Aligning Legal Notions with Behavioral Reality

Chrissy Giuliano1 (John Gamble2 and Charlotte Ku3), Penn State Behrend, 1Sam and Irene Black School of Business and 2School of Humanities and Social Sciences, and 3University of Illinois - Political Science

The simplest definition of laterality is the number of parties to a treaty. Laterality is an essential dimension to all treaties. Some legal scholars categorize treaties only as bilateral (exactly two parties) or multilateral (at least three parties). However, using bilateral, general multilateral, and plurilateral more accurately reflects the nature of treaties. Laterality in the Comprehensive Statistical Database of Multilateral Treaties (CSDMT) employs the distinction between general multilateral treaties (open to all states) and plurilateral treaties (restricted by geography and/or subject matter). Each category can be broken down further to assess the accuracy of “general” and “plurilateral” groupings. Studying the texts of treaties and the general/plurilateral variable in the CSDMT illustrates that, while the general/plurilateral dichotomy is important, it cannot always be clearly and unambiguously applied.

#### What’s in a Name? Final Acts and the Development of International Law

Chris Brown (John Gamble), Penn State Behrend, School of Humanities and Social

Sciences - Political Science

International legal scholars traditionally divide treaties into two categories: those that create legally binding-obligations and those that do not. Treaties deemed nonbinding are often ignored because many scholars feel they contribute little to the development of international law and do not meet a strict definition of “treaty.” In this study, I examined a very specific type of international agreement known as a final act, an instrument almost universally conceived as nonbinding. In many cases, final acts are little more than recorded minutes and a record of who served on the various committees at international conferences. However, I found that, in a number of cases, final acts played an important role in facilitating the adoption of binding legal commitments. While a final act alone may be meaningless, states often embed important provision within innocuous final acts. Further research is required to assess the a range of agreements traditionally categorized as nonbinding or soft law.

#### The Concept and Contours of Economic Treaties: A Quantitative Analysis of International Economic Law

Ryan Watson1,2 (John Gamble2), Penn State Behrend, 1Sam and Irene Black School of Business and 2School of Humanities and Social Sciences - Political Science

In today’s global economy, our current institutions, laws, and norms are under immense pressure. As the international legal system continues its attempt to keep up with the technological revolution, the need for new laws and institutions is apparent. However, most studies of economic regimes are narrowly focused on specific issues and developments, and seldom present a holistic, macroscopic view of the entire international legal system. The Comprehensive Statistical Database of Multilateral Treaties (CSDMT), a compilation containing virtually all multilateral treaties signed over the past 500 years, is an important tool for understanding and analyzing patterns in treaty making. This paper uses CSDMT’s functionality to develop a definition of “economic treaty.” By defining international economic law and international economic regimes through the use these legal instruments, we can discern trends in international economic treaty making and place this in the context of overall multilateral treaty making. Furthermore, watershed moments in economic treaty making can be identified and their effects analyzed. This macroscopic approach will provide a better understanding of the breadth, depth, and operations of economic treaties in the international legal system.

### PSYCHOLOGY

#### How Different Genres of Music Affect Levels of Aggression and Prosocial Behavior

Carrie Barr, Kelly Koziorowski, Amy Burns, and Laura Plocido (Charisse Nixon), Penn State Behrend, School of Humanities and Social Sciences - Psychology

The present research examines how different genres of music affect aggressive and prosocial behavior. The participants included 68 male and female college students, mostly from introductory psychology classes. Participants were randomly assigned to one of three music genres: contemporary Christian, classical, or rock music. Subjects listened to 10 minutes of the selected music through personal headphones. Tuckman’s (1988) Mood Thermometer was used, while a 20 item survey and a demographic/music preference questionnaire was administered. Results indicated no relationship among gender, genre of music, and behavior. However, a trend emerged for females revealing that when exposed to hard rock, females were more likely to report aggressive behavior. Implications and future directions are discussed.

#### The History of Drug Use in Western Civilization: Why We Are Ethically Obligated to Legalize Medicinal Marijuana

Shawn Campbell (Rodney Clark and Patricia Rutledge), Allegheny College - Psychology

This paper examines the historical use and abuse of drugs throughout the development of Western Society. Analysis begins with the first single-celled organism, and moves forward to modern times. Argument is made that drug use is neither a uniquely human, nor uniquely an American phenomenon. The paper examines the arguments made for and against the historical banning of marijuana, namely the scientific evidence. Argument is made that the banning of marijuana was not based in scientific evidence, but rather in moral, economic, political, and emotional reasoning. The paper also looks at current drug policy with regards to four major drugs: alcohol, tobacco, marijuana, and prescription pills, and argues that these policies are fundamentally flawed, because they lead to increased problems associated with the social and legal policies, rather than the drugs themselves. The paper argues this is particularly true with prescription pills and marijuana. Further argument is made that a continued ban on medicinal marijuana is unethical. The paper concludes that under certain controlled conditions we are morally and ethically obligated to provide relief from suffering if relief can be provided. The paper argues that marijuana can provide such relief and consequently there exists an ethical obligation to legalize medicinal marijuana.

#### Analyzing the Effects of Media on Empathy

Kristen Cauley and Stephen Wize (Jennifer Trich Kremer), Penn State Behrend, School of

Humanities and Social Sciences - Psychology

Previous research on aggression has found that individuals tend to act more aggressively after viewing violent or aggressive videos. However, the current researchers are interested in using the same paradigm to see whether empathy could be induced in individuals by having them watch videos. The participants will consist of students form Penn State Behrend. Each participant will be exposed to either a 20-minute empathy inducing video clip from “Extreme Makeover: Home Edition,” or a 20-minute neutral video clip of “Flip That House,” that will not include the deserving family aspect. Participants will complete a demographic survey including questions on age, race, gender, major, volunteer experience, and selected questions from the Hogan Empathy Scale. Participants will then watch one of the video clips and complete the BEES (Balanced Emotional Empathy Scale). We hypothesize that participants exposed to the empathetic video will score higher on the BEES than the participants who view the neutral video. The implications of this research could be very useful in better understanding potential ways to induce empathy in individuals.

#### The Influence of Parental Involvement and Rejection Sensitivity on Older Adolescents’ Involvement with Relational Aggression

Jason Crants and Lavon Thomas (Charisse Nixon), Penn State Behrend, School of Humanities and Social Sciences - Psychology

This study examined the relationship between parental factors, rejection sensitivity, and college students’ involvement with relational aggression (RA). Self reported measures included parental monitoring, parental trust, emotional availability, rejection sensitivity (RS), and RA. Based on past work we predicted positive relationships between parental factors, RS, and RA. Specifically, higher levels of parental involvement were expected to yield higher levels of RA. We also expected to find that lower levels of parental involvement were expected to yield higher levels of RA. Results will be discussed in terms of the importance of parental factors and individual difference variables in college students’ prediction of relationally aggressive behavior.

#### Influences of Meaningfulness, Self-Esteem, and Socioeconomic Status on Perceptions of Individuals with Tattoos

Kasey DeDad, Kristin McQueeney, and Stephanie Moryc (Jennifer Trich Kremer), Penn State Behrend, School of Humanities and Social Sciences - Psychology

Researchers have studied the roles of Attribution Theory and Social Learning Theory in regards to general perceptions of others. Attribution Theory focuses on how individuals attribute or explain their own behavior or the behavior of others. For example, a person could attribute a bad behavior to an external force (external attribution) and a good behavior (internal attribution) to them. Social Learning Theory suggests people prefer individuals based on information gathered from a social context. Little research has applied these theories to explaining how tattooed individuals are perceived. The current study will attempt to evaluate how others perceive people with tattoos within the context of Attribution and Social Learning Theory. Participants will complete a demographic, socioeconomic status (SES) and self-esteem scale. Then they will view tattoo images with four levels of explanation: no explanation, a short explanation, a short meaningful explanation, and a long meaningful explanation. Researchers expect that the more meaningful the explanation the more likely the participant will rank the tattoo more positively using a seven-point Likert scale. Researchers expect higher levels of self-esteem to correlate with a more positive perception of the tattooed individual. Researchers will also explore relationships of SES and attribution to the tattoo ratings.

#### Development/Implementation of a Mentoring Program Designed to Reduce Students’ Aggressive Behavior

Shelby Deutsch, Megan Hoffman, Jodie Kitchener, Katie Knight, and Steve Wize (Charisse Nixon), Penn State Behrend, School of Humanities and Social Sciences - Psychology

This study was developed to reduce students’ aggressive behavior, with particular attention given to relation aggression (RA). Past work has documented myriad adverse correlates related to RA, including loneliness, depression, anxiety, substance abuse, and suicidal ideation. To date, there have been few prevention/intervention efforts designed to reduce RA behavior. More effective prevention and intervention programs are needed to address this destructive behavior. To this end, a unique curriculum was designed to serve students at a cooperating private school in Erie, Pennsylvania. This curriculum included a whole school mentoring approach to reducing aggression. This mentor-driven approach included students, teachers, parents, and administrators. One of the major goals for this program was to raise awareness about relationally aggressive behavior, including the enormous costs to students and faculty. Participating middle and high school students were given a pretest and posttest to measure changes in beliefs and behaviors relating to their involvement with RA. Anticipated outcomes will be discussed.

#### Disability Stigma in a College Setting

Amy Dine and Jennifer Penfield (Jennifer Trich Kremer), Penn State Behrend, School of Humanities and Social Sciences - Psychology

Allport’s contact hypothesis (1979) was used to examine whether there is evidence of stigma demonstrated towards individuals with disabilities on a college campus. Allport states that individuals with a higher level of interpersonal contact with a stigmatized group of individuals would demonstrate less negative attitudes towards the stigmatized group. In the current study, we investigated if individuals reporting a lower level of contact with disabled individuals would be more likely to demonstrate stigma towards the disabled on a college campus. To test this, four vignettes were used to depict a cognitive (attention deficit hyperactive disorder), physical (wheelchair), and emotional (anorexia nervosa) disabilities, as well as a neutral control. Participants completed a modified version of Bogardus’ Social Distance Scale (1935) after each vignette as a measure of stigma. In addition, a modified Level of Contact report created by Holmes, Corrigan, Williams, Canar, & Kubiak (1999), was utilized to establish a baseline of the participant’s personal experience with individuals with disabilities. Consistent with current research, it is expected that we find an increased amount of stigma in individuals which demonstrate a lower amount of social contact with disabled persons.

#### Democratic Engagement: The Influence of College Students’ Relationships on Participation

Julie Elkins and Amanda Tyler (Melissa Surawski and Jennifer Trich Kremer), Penn State Behrend, School of Humanities and Social Sciences - Psychology

The researchers were interested in studying the factors that affect democratic engagement of college students at a land-grant university. After compiling findings of previous research, they developed a comprehensive framework of predicting factors of engagement, which focused on the relationships that people have with others, their community, and the government. They hypothesized that perceived social support, neighborhood belonging, political knowledge and efficacy, and civic duty would all predict engagement behavior. Using a battery of surveys, the researchers measured the variables of interest. They then used an exploratory factor analysis to test for a three-factor framework, regression analyses to analyze how much of the variance in democratic engagement behavior is due to the predicting factors, and correlations to analyze the possible relationships between each predicting variable and engagement. The researchers expect to find that the three- relationship framework is an accurate depiction of predicting factors of engagement. They also expect that relationship with others, relationship with the community, and relationship with the government will be significant predictors of engagement. This study is a step towards developing more effective programs and teaching methods to enhance student democratic engagement, which is a key duty of land-grant institutions.

#### Effects of Lexical Training and Music Experience on Foreign-Accent Normalization: An Event-Related Potential Study

Chelsea Fenush, Andrew Scheller, Samantha DeDionisio, and Zackary Goncz (Victoria Kazmerski and Dawn Blasko), Penn State Behrend, School of Humanities and Social Sciences - Psychology

Foreign accents can pose communication barriers in many situations, such as college classrooms and hospitals. The current study sought to create a short-term auditory lexical training module that would facilitate the ability to accurately perceive speech accents. Participants with high and low musical experience were exposed to lexical strings (words and nonwords) and were instructed to press either “W” for word or “N” for nonword as quickly and as accurately as possible on a response box. Participants in each group were randomly assigned to a training or no-training condition. The training integrated feedback as well as the visual stimulus of the lexical string. A pretest was given prior to training and a posttest was given afterwards in an attempt to measure their behavioral improvement. Event-related potentials (ERPs) were recorded continuously. Results suggest that musicians, as opposed to nonmusicians, showed more improvement for foreign-word identification after training. Although, training effects were not significant for response times, the ERPs showed clear differences. ERPs for musicians differed from nonmusicians in showing an earlier onset of the training effect. These data suggest that musical training may develop acoustic processing systems in such a way to speed normalization of a foreign accent.

#### The Impact of Mental Labels on Trust: How Public Stigmas Alter Perceptions

James Hodge and Annie Kozel (Charisse Nixon), Penn State Behrend, School of Humanities and Social Sciences - Psychology

The primary goal of this study was to determine the effect of mental labels on trust. Specifically, we were interested in the effect of how public stigmas influence trust. Public stigmas are the views that others have of an individual, which are often internalized as self-stigmas. Trust is the expectancy about an individual or group that the word, promise, or verbal/written statement of that individual or group can be relied upon (Kaplan, 1973). Past research has argued that trust may be the single most important ingredient for the development and maintenance of adaptive relationships. Participants were randomly assigned to one of four conditions (i.e. depression, obsessive-compulsive disorder, schizophrenia, or no label). Each condition was described in a simple vignette scenario. Results indicated that participants trusted all of the other labels more than schizophrenia, even while controlling for level of understanding and experience with mental illness. Implications and future directions will be discussed.

#### An Analysis of Eyewitness Lineup Type, Personality, and the New Jersey Method

Derek McKay and Jillian Mrozowski (Jennifer Trich Kremer), Penn State Behrend, School of Humanities and Social Sciences - Psychology

In this study, the researchers used the software program, PC\_Eyewitness to investigate the accuracy of eyewitness identification in simultaneous (all at once) versus sequential (one at a time) lineups with target-present and target-absent conditions. The program allows participants to view a simulated crime video and make a decision about the culprit using either form of the lineup. In addition, we investigated the use of the New Jersey Method, which involves giving the participant a second opportunity to view the lineup. We obtained participants through the Penn State Behrend Research Participation Pool. We also investigated the relationship between lineup accuracy and personality factors including extraversion, conscientiousness, neuroticism, openness, and agreeableness. In order to assess personality, the Mini-Marker Personality Assessment was used. Results should indicate that when the target is present, simultaneous lineups are superior in obtaining correct identifications and reducing false rejections. When the target is absent, the sequential lineup will obtain more correct rejections. When the New Jersey Method is used, the target-present simultaneous and the target-absent sequential advantages will be lost. Individuals with higher levels of extraversion, conscientiousness, and openness and low levels of agreeableness and neuroticism should serve as more reliable witnesses.

#### The Effect of Race on College Students’ Preferential Treatment in the Form of Punishment toward Others

Jennifer Smith and Erin Winkelvoss (Charisse Nixon), Penn State Behrend, School of Humanities and Social Sciences - Psychology

Racial stereotypes can often lead to racial discrimination in the form of preferential treatment for specific categories of people. Examining whether racial discrimination exists in the form of preferential treatment among college students could help to better understand the extent of racial discrimination on campuses. This study examined the effect of race on college students’ preferential treatment. Preferential treatment was measured by examining the degree of punishment given to each of the three races (White, Black, and Arab American) for a given scenario. Race was implied by the name of the student given in the scenario. Inconsistent with past research, the results indicated punishment in relation to race did not vary significantly. In addition, there were no gender effects.

#### Relationship between Attachment, Connectedness, and College Students’ Adjustment

Anne Spring, Nancy Baker, and Jennifer LaRoche (Charisse Nixon), Penn State Behrend, School of Humanities and Social Sciences - Psychology

Previous research suggested parental attachment behaviors formulated in younger years may provide a context for social connections formed in college. This framework may serve as a proxy for relationships in older adolescents. This study examined the relationship between attachment styles, levels of connectedness, and college students’ adjustment. Based on previous research, we expected students with positive attachment styles and meaningful social and campus connections would demonstrate higher levels of adjustment. Findings revealed that both dimensions of connectedness played a significant role in college students’ adjustment. However, the role of attachment was only significant for peer relationships. No main effects, interactions, or gender effects were found.

#### An Analysis of Premature Deaths of NFL Players and WWE Wrestlers

Brad Trainer and Bobby Staaf (Jennifer Trich Kremer), Penn State Behrend, School of

Humanities and Social Sciences - Psychology

Recently World Wrestling Entertainment (WWE) has come under scrutiny for steroid and prescription drug abuse. The media has been looking at a number of deaths that occurred in the organization. This study aims to compare the death rates in WWE to the death rates in the NFL. We divided the deaths in three categories: death from overdose (from prescription pills or recreational drugs), death from a heart attack, and an overarching category (fluke accident, suicide, and murder). We predict our results will show that there are statistically significant correlations with WWE wrestlers and death from a heart attack and death from overdose, with heart attack having the strongest correlation. We predict the NFL players to only be statistically significantly correlated with the overarching category. We will be performing a chi-square test to ensure that our findings are not due to chance. The results of this study can be used as a basis for what specific issues need to be examined for each sport, with a goal to reduce such problems in the future.

#### Art Therapy and the Effects it Has on Reducing Stress in At-Risk Youth

Marika Whiting, Amanda Turner, and Anna Pennington (Jennifer Trich Kremer and Dawn Blasko), Penn State Behrend, School of Humanities and Social Sciences - Psychology

Schools, healthcare providers, and parents spend significant time identifying “at-risk” children, attempting to uncover the true reason behind their hostility. Research has shown that many forms of art can provide therapeutic outlets for aggressive children. In the current project, a creative arts program was adapted for the “at-risk” children enrolled in the RAPS (Relationships are Pathways to Success) Ophelia program to study how art therapy promotes coping skills and stress reduction. Teachers and parents at four different Erie City schools identified students as “at-risk” for relational aggressive behavior and invited the children to join the RAPS program. For this study, the students participated in six art activities and had discussions related to coping with stress and the goals of the Ophelia Project. The Perceived Stress Scale survey was given before and after the art activities to identify any reductions in stress. Mini questionnaires were distributed after each art lesson to evaluate the lesson goals and student enjoyment levels. The researchers expect to find a significant reduction in stress after the art activities, and there would be no difference in gender or stress levels at the different schools.

### SECONDARY MATHEMATICS EDUCATION

#### Examining the Relationship between New York and Texas Public K-12 School Teachers’ Images of Mathematics and Their Mathematics History Knowledge

John Fullwood and Kelly Mowery (Danielle Goodwin), Penn State Behrend, School of Science - Secondary Mathematics Education

Dr. Danielle Goodwin is researching the relationship between the images of mathematics and mathematics history knowledge held by K-12 public school teachers nationwide. John Fullwood led the study of the New York state K-12 public school teachers and Kelly Mowery led the study of Texas state K-12 public school teachers as part of this effort. An electronic survey was sent to the teacher participants in February of 2008. In March and April of 2008, John and Kelly worked with Dr. Goodwin to analyze the data received from New York and Texas teachers. We found out what images New York and Texas state teachers have about mathematics, how much mathematics history they know and the relationships between their history knowledge and their images of mathematics. Teachers’ images of mathematics are very important to study because they affect what teachers do in the classroom. Also, it is believed that knowing mathematics history deepens teachers’ understandings of the nature of mathematics. Our study is the first of its kind to establish whether teachers’ knowledge of mathematics history is significantly related to their images of mathematics.

#### Examining Student Interactions within an Active Learning Environment in a Calculus-Based Introductory Physics Course

Heather Wager and Jason Reed (Danielle Goodwin, Jonathan Hall, Paul Ashcraft, and J. Andrew George), Penn State Behrend, School of Science - Secondary Mathematics Education

Heather Wager and Jason Reed are student researchers assisting Dr. Danielle Goodwin, Professor Jonathan Hall and Professor Paul Ashcraft in researching student attitudes and performance in the SCALE-UP Physics 211 class. They attended each spring 2008 SCALE-UP class, taking detailed field notes on classroom interactions, and teacher and student attitudes and behaviors. These undergraduate researchers were trained in qualitative research methods. At different points in the semester, the field observations used different focusing questions, such as:

* Do male and female groups of students problem solve differently?
* Is SCALE-UP serving female students well?
* Is SCALE-UP serving minority students well?
* Is SCALE-UP helping to reduce the number of students leaving the class with misconceptions about physics?

The student researchers also hosted weekly focus groups to collect more in-depth data on deeper questions or to focus on certain subgroups of the student population (such as female and minority students).

## POSTER PRESENTATION ABSTRACTS

### BIOLOGY AND GEOLOGY

#### The Application of Genescan Technology to the Classification of Alleles of mtSSBP in Human Breast Cancer Samples

Jonathan Douds, Ruth Gonnella, and Jennifer Montgomery (Durwood Ray), Grove City College - Molecular Biology

Prior research has shown that an increase in mitochondrial DNA replication may correlate to an increased risk for breast cancer. Grove City College students discovered a 16-base-pair indel in the promoter region of mtSSBP, leading to the detection of three alleles: homozygous short, homozygous long, and heterozygous. The current study extended this research to identifying a possible link between the possession of a certain allele and an increased risk for breast cancer. This study utilized Polymerase Chain Reaction (PCR) and a fluorescent primer to amplify the promoter region of mtSSBP in DNA from breast cancer patients from Texas. This DNA was then analyzed using Genescan software on an ABI automated DNA analyzer. The base-pair length of each sample was compared to the lengths of samples that had previously been sequenced. Examination of the base-pair size of the samples led to the classification of each sample’s allele. After analyzing 15 samples by Genescan, the technique was found to yield consistent results.

#### Testing Ages of Mapped Surficial Deposits in Northwestern Pennsylvania Using Soil-Age Relationships

Kara Emmert1 (Eric Straffin1 and Todd Grote2), 1Edinboro University of Pennsylvania and 2Allegheny College - Geology

Surficial geologic maps of northwestern Pennsylvania illustrate several episodes of glaciation, which resulted in deposits with clearly established relative-age relationships. Absolute ages of these deposits, however, are poorly constrained and there is mounting evidence that there may be problems with previous interpretations regarding the timing of glacial advance and retreat. This study examines soil development in deposits of known relative age, but unknown absolute age. Soil development is in part a function of time, and thus may be used to estimate the age of landforms. Our goal was to test hypotheses concerning the length of time that landforms have been exposed to weathering and soil formation. Three soil profiles were examined to determine development correlations relative to glacial advance/retreat across the region. The youngest (Wisconsin age) profile was located in Erie County, Pennsylvania and two older (Illinoisan) profiles were located in Venango County, Pennsylvania. Differences in soil development were evaluated by field observation and laboratory analysis. The number and depth of horizons, pedogenic clay content, and pH indicate an age correlation between the profiles. Further quantification of age relationships through analysis of mineralogical and geochemical data will help to more narrowly constrain the time required to form the soils described here.

#### C/EBPβ Regulation of JunD Gene Expression to Mediate Cell Survival

Cody Filges (Sarah Ewing), Penn State Behrend, School of Science - Biology

C/EBPβ is a member of the CCAAT/enhancer binding protein transcription factor family that is known to promote cell survival and this may be linked to tumor development. Understanding the mechanisms through which C/EBPβ regulates cell survival could lead to the development of novel chemotherapy treatments that block C/EBPβ function and thereby promote tumor regression. One potential mechanism is the ability of C/EBPβ to regulate gene expression. Identifying genes responsible for mediating C/EBPβ’s function in cell survival is needed. Preliminary studies have shown that JunD gene expression was down-regulated in C/EBPβ-deficient mouse epidermis compared to wild type. From the attained mouse epidermis mRNA sequences, primers were designed to detect the JunD mRNA sequence and transcribe it to cDNA. The cDNA was then amplified by using real-time reverse transcriptase polymerase chain reaction (RT-PCR). Analysis of the mRNA expression patterns for JunD between C/EBPβ-deficient and wild type mouse epidermal samples will confirm the preliminary studies. These results will allow further analysis for the regulation of JunD protein by C/EBPβ and determination of the role of C/EBPβ regulation of JunD in mediating cell survival.

#### A Molecular Genetic Approach to Studying Folate Metabolism in Zebrafish (Danio rerio)

Wes Flynn, Dave Machuga, Julie Ober, and Brittanie Everhart (James Warren Jr.), Penn State Behrend, School of Science - Biology

Folate is a water-soluble B-vitamin obtained in our diets, which is vitally important as a coenzyme in the synthesis of nucleic acids, regeneration of methionine, and various metabolic reactions involving one carbon transfers. Depleted folate levels can lead to the accumulation of excess homocysteine, an endogenous form of methylated cysteine, which when present in high concentrations has been linked to a wide variety of developmental and adult onset disorders. These disorders include, but are not limited to: neural tube defects (NTDs) such as spina bifida and anencephaly, depression, arthrosclerosis, arteriosclerosis, increased incidence of cancers, type 2 diabetes, and Alzheimer’s. This laboratory has characterized and cloned many of the key zebrafish genes involved in folate metabolism. This study describes the different experimental approaches this laboratory uses to elucidate the molecular genetic mechanisms relating folate metabolism to the aforementioned disorders. Previous and ongoing studies using techniques such as gene expression analyses, bioinformatics, immunohistochemisty, immunofluorescence, and pharmacologic approaches will be described.

#### Habitat and Avian Assessment for the Lake Pleasant Wetlands

Megan Gapinski and Brianne Hall (Lisa Mangel), Penn State Behrend, School of Science - Biology

The Lake Pleasant wetlands are currently being threatened by the spread of pollution, as well as the uptake of exotic plants and animals, which causes the infrastructure of the region to change dramatically. The objective of this study was to obtain avian habitat and population information, compare the data to previous assessments (2003, 2005), and make a correlation of the trends to be used by the Western Pennsylvania Conservancy (WPC) for management purposes. The assessment was performed for a target list that contained 12 species of birds. The data showed a slight population decrease in seven species with a slight population increase in the remaining five species in comparison to the 2005 data. Comparison of the data showed a shift of avian populations to interior regions of the wetlands. Increased noise level and water fluctuations may have accounted for the inward move. The population data may have variations due to changes in timing, exact test locations, observers, and weather conditions, since comparisons were made for three separate studies spanning a period of five years. Overall, the avian habitat and population assessment for Lake Pleasant has shown an increasing trend from 2003-2007 for all species in the avian target list.

#### Edinboro Lake Eutrophication: Phosphorus Input and Remediation

Barbara Hanes and Margaret Mogush (Brian Zimmerman), Edinboro University of Pennsylvania - Geology

Edinboro Lake is eutrophic, a condition caused by excessive amounts of phosphorous entering the lake from the surrounding watershed. There is an accepted correlation between riparian buffer quality and phosphorous levels in a stream system. This study seeks to identify sub-watersheds of Edinboro Lake where improvements in riparian buffer quality will most significantly reduce phosphorous loading to the lake. ArcGIS and aerial photos were used to analyze riparian buffers for all tributaries to Edinboro Lake. Streams were divided into segments and scored based on the distance from the stream bank to the closest human modification. The linear total of segments for each score was compared by subwatershed to the total stream length to determine the percentage of each buffer width in the subwatershed. This data was then compared to measured phosphorous inputs determined by a previous study. Land use and cover, which impacts cultural phosphorous inputs, and soil permeability, affecting infiltration and phosphorous bonding to soil particles and removal, were also examined. Our research shows a strong relationship between reduced buffer quality, poor soil permeability, and heavy human land use to increased phosphorous load. These relationships suggest that targeting specific subwatersheds for improved riparian buffer quality may serve to significantly reduce the phosphorous entering Edinboro Lake.

#### Effects of Nitric Oxide on hIK1 Expression Levels

Alissa Mague (Heather Jones), Penn State Behrend, School of Science - Biology

The calcium (Ca2+)-activated potassium (K+) channel, hIK1, is an epithelial ion channel having roles in many essential physiological functions including: ion transport, cell volume regulation and endothelial cell hyperpolarization. Nitric oxide (NO) is a potent vasodilator which allows for relaxation of the smooth muscle surrounding the capillary endothelial cells. Since both hIK1 and NO are involved in endothelial cell vasoregulation, we determined the effect NO has on hIK1 protein expression. The effects of the NO donors: SNAP and PAPNONOate and the NOS inhibitor, L-NMNA were examined. Human embryonic kidney (HEK) cells transfected with hIK1 protein were treated with NO agents 18 hours prior to experimentation. Cells were lysed, total protein collected, and run on SDS-PAGE gel. Antibodies were used to detect total hIK1 protein in treated verses untreated HEK cells. Results showed that elevated NO levels increased total hIK1 protein expression when compared to untreated cells. Lowering NO levels decreased total protein expression. Localization of hIK1 at the cell surface is regulated and may be altered by various signaling molecules. The inhibitor of NOS decreased hIK1 levels at the plasma membrane as assessed by cell surface immunoprecipitation. These results suggest that NO plays an important role in the regulation of hIK1 expression which may be related to its role in endothelial cell function.

#### Evaluation of Arabidopsis Mutants Generated by Expressing Genes from Tomato Fruits

Daryl Nowacki, Chris Mosebach, Abraham Kibbey, Amy Sahlmann, Marcie Ryhal, and Angelica Jones (Yi-Hong Wang), Penn State Behrend, School of Science - Biology

The goal of the project was to make a tomato fruit cDNA library which will then be used to generate a collection of overexpression mutants in *Arabidopsis*. Subsequent evaluation of these mutants would facilitate the identification and functional characterization of tomato genes. Traditional cDNA libraries have been made for many species. But these libraries contain a higher percentage of truncated genes (cDNAs). In this project, a cDNA library is made with a plant transformation-ready binary vector. The whole library or selected individual clones can be used to transform *Arabidopsis* or any other plant species. In addition, a majority of the clones in the library will be full-length because synthesized double-stranded cDNA was size-selected using gel electrophoresis rather than a column. cDNA sizes of 2-5 kb are gel-purified for ligation onto the binary vector. Sequencing of 81 cDNA clones indicates that 70 percent (56) were full-length genes. The library was used to transform *Arabidopsis* plants. Among the initial 80 transformants, one was found to grow better in a stressful environment. Molecular analysis indicates that in this plant a tomato stress gene was overexpressed. The technique can be used in any other plant species as a gene discovery tool.

#### Characterization of the N-Glycan Dependant Apical Sorting Mechanism Used by Endolyn

Michael Piscitelli (Beth Potter), Penn State Behrend, School of Science - Biology

Epithelial cells exhibit a polarized structure with two distinct membrane domains, apical and basolateral, allowing them to interact separately with our internal and external environments, providing protection and regulation of ions and nutrients to the body’s vital organs. To generate distinct domains, proteins must contain specific sorting signals that are recognized in the Golgi apparatus. Apical sorting signals are frequently found within the membrane- or lumenally oriented regions and may include N- and O-glycans, glycosylphosphatidylinositol (GPI) anchors, or specific trans-membrane residues. The mechanism for N-glycan-dependant trafficking is unknown. One proposed mechanism involves the use of a receptor which may bind glycans directly or a protein conformation that is stabilized by the glycans. To discern between these possibilities, the lysosomal protein endolyn will be studied. Two specific N-glycans located on a disulfide loop domain formed by disulfide bonds between cysteines at positions 63 and 96 and 66 and 77, have been shown to be important. Site directed mutagenesis has been used to mutate cysteine residues at position 63 and 66 and will be used to mutate the others with their effects on trafficking assayed using immunoflorescence. If trafficking is not affected, then receptors bind glycans directly; conversely, if trafficking is affected then a structural domain is important.

#### An Investigation of the Hemotoxicity of the Secretion of the Duvernoy’s Gland of the Northern Water Snake (Nerodia sipedon)

Daniel Ranayhossaini (Margaret Voss and Michael Campbell), Penn State Behrend, School of Science - Biology

The northern water snake (*Nerodia sipedon*) is a member of the family Colubridae and is a common sight on many lakes and streams in the eastern United States. *N. sipedon* preys primarily on fish and other aquatic organisms in an environment where constriction is no longer an effective method of killing prey. For this reason, *N. sipedon* was selected as a subject to test for the presence of venoms in the saliva of Colubrid snakes; specifically in the secretions produced by the Duvernoy’s gland. This gland has previously been connected with toxin production. Ten salivary swabs and Duvernoy’s gland secretions were collected over the summer of 2007. It was determined that the optimal season for capturing specimens occurs in late May when the snakes are breeding. Minnow traps baited with minnows effectively attract and detain the snakes. After the middle of June, collection of snakes becomes extremely difficult and nearly futile. It was also determined that by proceeding with a cotton swab collection first, Duvernoy’s gland secretions of higher purity can be acquired from the back of the maxillary jaw. During the collection of the samples, a pocket between the back of the jaw and the lip of *N. sipedon* was identified that yielded higher volume samples that represent nearly pure Duvernoy’s gland secretions. The phylogenetic pattern resulting from the presence or absence of this pocket in related snake species (e.g., thayeri kingsnakes, *Lampropeltis mexicana thayeri*) suggests that it might be an adaptive anatomical structure that functions as a primitive venom gland. Continued research is necessary to further verify this claim. The salivary swab samples were quantified by a Bradford protein assay with a spectrophotometer. It was established that there was between 5 and 10 mg of protein per salivary swab. The proteins from the salivary swabs were then subjected to a sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) that yielded proteins of molecular weights 150, 74, 24, 22, 19, and 17 kDa. At the time of writing a 2D SDS-PAGE of the salivary samples was being prepared to compare the saliva proteins to those of known hemotoxic venoms. Plans are in place to analyze the effects of the saliva on red blood cell and platelet counts in mammalian and fish blood samples.

#### Protein Domains Involved in hIK1 Co-Assembly with Molecular Chaperones

Colleen White (Heather Jones), Penn State Behrend, School of Science - Biology

The ability of proteins to traffic properly to the cell surface requires that they be properly folded in the ER. The cell has chaperone proteins which help produce proper quality proteins. These chaperones will bind to specific domains within the proteins. Chaperones mediate trafficking of both properly assembled proteins and mis-folded proteins and determine whether they can traffic out of the ER to the plasma membrane or be retained and eventually degraded in the proteosome. Two chaperones which may regulate ion channel cell surface expression are HSP70 and HSP90. I have examined the role of HSP70 and HSP90 in the trafficking of hIK1, an intermediate conductance, calcium-activated potassium channel. Both of these HSP’s are present in our cell system, HEK, and show the ability to co-assemble with hIK1. Currently, I am studying the amino acid domains of hIK1 which are responsible for this association. Using site-directed mutagenesis I have mutated two charged di-arginine repeats to alanines near the pore of the channel. Di-arginine sequences have been demonstrated to be involved in chaperone binding and therefore maybe responsible for these interactions in hIK1. These mutated hIK1 proteins will be examined to determine if they able to traffic to the cell membrane and their assembly with the chaperone proteins.

### CHEMISTRY

#### Synthesis and Investigation of the Photochromic Properties of Platinum(II) Complexes with Tridentate Schiff-Base Condensates

Danielle Chung (Alan Jircitano), Penn State Behrend, School of Science - Chemistry

2-Aminobenzaldehyde (oab) is an interesting molecule that undergoes a variety of self-condensation reactions, depending on the absence or presence of a metal ion. Reaction with aqueous Pt(II) produces a dimeric Schiff-base condensate, [N-(2-aminobenzylidene)anthranilaldehydato-O,N,N']chloroplatinium(II) (Pt(AAA)Cl) (I). The complex is unusual in that it is photochromic in coordinating solvents. In acetonitrile, for example, the solution is orange-red in the dark and purple when exposed to light. The coordinated aldehyde is displaced by the solvent in the dark and reattaches in the light. In this study, an analogous complex was synthesized with a phenolate *trans* to the coordinating aldehyde. N-(2-hydroxybenzylidene)anthranilaldehyde was synthesized by manganese(IV) oxide oxidation of the Schiff-base condensate of salicylaldehyde (and derivatives) with 2-aminobenzyl alcohol. The dark purple complex, [N-(2-hydroxybenzylidene)anthranilaldehydato-O,N,O']-chloroplatinium(II) (Pt(HAA)Cl) (II), was formed from the direct combination of Pt(II) with the ligand in water. The ligand was characterized by IR and NMR and the photochromic reaction of the platinum(II) complexes is being investigated.

#### Strategies for Synthesis of Benzoxazoles and Related Heterocycles

Luke Joseph (Martin Kociolek), Penn State Behrend, School of Science - Chemistry

Benzoxazoles and related compounds are an important class of nitrogen-oxygen heterocycles. They are found as structural units in numerous compounds of biological interest. As such, the synthesis of compounds in this class is of much interest. There are few methods for the synthesis of benzo-fused heterocycles by formation of N-O bonds. This work focuses on developing new reliable methods for the synthesis of these heterocycles. One oxidant that has shown promise in the synthesis of benzo-fused heterocycles is iodobenzene diacetate. Previous work has shown that by treating 2’-hydroxyacetophenone imine with iodobenzene diacetate, it undergoes a Beckman rearrangement and cyclization to give 2-methyl benzoxazole. Knowing this, the use of iodobenzene diacetate as an oxidizing agent for the synthesis of a number of benzoxazoles and related heterocycles is being investigated. Initial work, has shown that the oxidation of

2’-hydroxyacetophenone oxime results in 2-methyl-benisoxazole-N-oxide in good yields. Ongoing investigations, involving the oxidative cyclization of salicylohydroxamic acid as well as anthranilic acid and its derivative esters will also be discussed. The scope, limitations and application of these novel synthetic methods using iodobenzene diacetate will be reported on.

#### Investigation into the Synthesis of Flavone and Anthocyanidin Antioxidants

Andrew Law (Martin Kociolek), Penn State Behrend, School of Science - Chemistry

The importance of antioxidants has been well documented and investigations into novel compounds with antioxidant activity are of much interest. With this in mind, this work focuses on two major classes of these antioxidants, anthocyanidins and flavanones. Flavanones, such as naringenin, can be isolated from many natural sources and are readily available. Because of this, naringenin could potentially be a good starting material for the synthesis of novel flavanone antioxidants. The first goal of the project is to develop a method to synthesize analogues of naringenin, with the hope that they will have similar biological properties. The strategy for synthesis of these derivatives involves the selective iodination of the endocyclic ring of naringenin, followed by Suzuki coupling reactions to add a variety of functional groups. The development of these reactions will be presented. The second goal of the project is to use naringenin as a source for anthocyanidin antioxidants. It is envisioned that naringenin can be either oxidized or reduced in a series of steps to give anthocyanidin. The development of this chemistry will also be discussed. The anticipated outcome of this work is to synthesize novel antioxidants based on the naringenin ring structure.

#### Bucky-ball Complexes with Cyclohexane, Benzene, and Toluene

Megan Lundgren, Joshua Snedden, and Joshua Carlson (Arshad Khan), Penn State DuBois - Chemistry

Bucky-ball (BB, C60) gives a purple colored solution soon after it is dissolved in cyclohexane, benzene, or toluene. The cyclohexane (chx) solution turns almost colorless in three weeks, the benzene (bz) solution turns yellow in seven weeks, and only the toluene (tol) solution retains its purple color. The temperature effect, especially for benzene and toluene solutions indicates a growth in the purple complex as temperature is increased suggesting that the above color change cannot be due to thermal instability of the complex. The experimental result indicates a gradual change (with time) from the purple colored BB-chx or BB-bz complex to a different complex that gives a significantly different spectrum (graph on the right). The purple colored BB-tol complex presumably resists such a transformation. Computational studies are underway to explain these observations.

#### Characterization of a Methanol Benzene Complex in Nitrogen and Argon Matrices Using Matrix-Isolated Infrared Spectroscopy

Natalie Romano (Jay Amicangelo), Penn State Behrend, School of Science - Chemistry

Matrix-isolation infrared spectroscopy was used to characterize a complex between methanol (CH3OH) and benzene (C6H6). Co-deposition experiments with CH3OH and C6H6 were performed at 17 oK using nitrogen and argon matrices. Sample to matrix concentrations ranged from 1:200 to 1:2000 for both CH3OH and C6H6 samples. New infrared bands attributable to the complex (CH3OH·C6H6) were observed near the fundamental modes for the methanol and benzene monomer vibrations. Identification of the new infrared bands to those of the complex were established by comparing the co-deposition spectra with the spectra of the individual monomers, by performing experiments with isotopic methanol (CD3OD, CD3OH, and CH3OD) and benzene (C6D6), and by matrix annealing experiments (warming to 30 oK and refreezing to 17 oK). Quantum chemical calculations were also performed at the B3LYP/aug-cc-PVDZ level of theory for the CH3OH·C6H6 complex, to obtain theoretical support for our infrared assignments. The optimized geometries of the complex were calculated and vibrational frequency analyses were performed for the optimized geometries. The calculations predict the vibrational frequencies in the CH3OH·C6H6 complex to be shifted with respect to the CH3OH and C6H6 monomers by similar magnitudes as to what we observe experimentally, lending support to our frequency assignments.

#### Synthesis and Characterization of Novel Photochromic Pt(II) Complexes of o-Aminobenzaldehyde and Derivatives

Damon Schersten (Alan Jircitano), Penn State Behrend, School of Science - Chemistry

*cis*-[N-(*o*-aminobenzelidene)anthranilaldehydato-O,N,N’] chloroplatinum(II), Pt(AAA) is a photochromic compound that has been well characterized. The compound possesses the ability to change colors in the presence or absence of visible radiation when dissolved in suitable coordinating solvents. Previously, several derivatives of Pt(AAA)Cl with various substituents attached to its aromatic ring have been synthesized in an attempt to elucidate the mechanism of this unique photochromic reaction. Different degrees and rates of color change have been observed with these varying substituents. Electron donating substituents have been shown to decrease the rate of color change, while electron withdrawing substituents have been shown to increase it. Slight color shifts have also been observed. In this study a different electron donating substituent, a phenyl group was added to the aromatic ring to create 5-phenyl-Pt(AAA)Cl through a multistep synthesis. 5-phenyl-Pt(AAA)Cl was formed through the Schiff-Base condensation of 3-nitrobiphenyl-4-carboxaldehyde in the presence of a platinum salt, K2PtCl4. The synthesis of the molecule incorporated the Suzuki-Mayaura coupling reaction which enables different substituents to be added very efficiently.

### COMPUTER SCIENCE

#### Online Course Management System

Brandon Garzel, Anthony Moore, and William Peterson (Charles Burchard and Danielle Goodwin), Penn State Behrend, School of Science - Computer Science

Online course management systems are becoming more advanced and are being widely accepted by many institutions offering online courses. With the increasing number of courses being offered online by institutions there is a need for a stable, effective course management system. Penn State’s push for more online courses highlights the need for such a system. Commercial systems like Angel and Blackboard and open-source software like Moodle are already available for use, but lack the user validation systems. These course management systems are more suited for use as teaching aids, rather than online course delivery vehicles.

This paper proposes a system that allows professors to upload content and develop dynamic database-generated tests and quizzes. Such a system would need to have extensive user validation modules. For example, the use of a web cam to take a picture of the user at various points during tests and key data checks throughout the course. Students should be able to view grades, take quizzes and tests, download content, and post to blog discussions.

#### Amorphous Systems Modeling

Alicia Klinvex (Blair Tuttle, Ronald McCarty, and Gary Walker), Penn State Behrend, School of Science - Computer Science

Amorphous silicon (a-Si) is a material used in many technological devices, such as transistors and solar cells. Models of a-Si would therefore be very useful to the scientific community. They would allow physicists to study the formation of defects in solar cells and various other microscopic phenomena. As a result, I developed a program that generates models of materials like a-Si in order to enhance our understanding of their properties.

#### Biometric Authentication

Derek Mulder, Tom Hazlett, and Jasmin Tufek (Charles Burchard), Penn State Behrend, School of Science - Computer Science

The use of biometric identification has grown in popularity as a method of security. While fingerprint verification is becoming common; accurate facial recognition remains a significant challenge. The goal of the Biometric Authentication system is to develop a security solution which combines accurate facial recognition and fingerprint verification.

#### A Simple Tiling Window Manager

Vincent Povirk (Gary Walker and Meng Su), Penn State Behrend, School of Science - Computer Science

A window manager is a component of a graphical environment that allows users to control the size and location of windows, close windows, and decide which window has the focus. Most modern window managers assign each window an independent size and location. This kind of system does little to assist users in positioning windows conveniently. Tiling window managers can make some tasks easier by ensuring that visible windows fill the available space and do not overlap, but they are rarely used today. Existing tiling window managers suffer because they either force users to learn too many options and commands or provide very little flexibility. I am building a tiling window manager for Linux that provides only two operations for manipulating layouts: split and resize. Splitting cuts a window's space in half, using one of the halves to display another window. Resizing moves a window's border and makes limited adjustments to the rest of the layout. Using only these two commands, it is possible to create any layout that meets the tiling constraint. This project will provide a viable alternative to traditional systems for people who would not otherwise find a tiling window manager useful.

### ENGINEERING

#### Property Verification of Thermoplastic Elastomer Bottles Produced from Custom-Designed Extrusion Blow Molding Molds

Daniel Dempsey and Millington Adkins IV (Jonathan Meckley), Penn State Behrend, School of Engineering - Plastics Engineering Technology

Santoprene grade 201-87 is a common thermoplastic vulcanizate (TPV) used in blow molding because of its excellent melt strength which leads to less sag in the parison, and ultimately lower wall thickness variations and a higher achievable maximum blow-up ratio (BUR). However 201-87 (TPV 1) also has a particularly high durometer, which becomes a disadvantage in dextral applications. Santoprene grade 201-55 (TPV 2) is another TPV with mechanical characteristics comparable to that of the TPV 1, but with a much lower durometer and maximum achievable blow-up ratio. The objective of this study was the retention of mechanical characteristics of the two TPV grades being subjected to increased additive amounts of a polymer modifier, Vistamaxx 6102 (Additive 1).

#### Modeling of Electrostatic Fringe-Field Effects on the Performance of Micro-Beams

Laura DeWalt (Oladipo Onipede), Penn State Behrend, School of Engineering - Mechanical Engineering

Many microelectromechanical (MEMS) devices, such as comb drives are driven using electrostatic forces. The standard way of calculating the electrostatic force produced is based on computing the capacitance between two parallel plates while ignoring the fringing fields produced at the sides and ends of the plates. This is generally a good assumption as long as the surfaces remain parallel and the distance between them is small when compared to the overall dimensions. This simplified-parallel-plate model is the basis used in the design and analysis of comb drives. To properly drive and control the comb drive, it is important that the proper driving voltage is predicted and applied. If there is some error in the predicted driving voltage, the system may not function as desired. The goal of this research project was to determine under which conditions fringing fields are significant by comparing results from a parallel-plate-capacitor model to a more complex numerical model that includes the contribution to the capacitance of the fringing fields. A better understanding of the capacitance of the comb drive will allow a more accurate prediction of the driving voltage and pull-in voltages, which could lead to more robust designs of comb drives.

#### Experimental Measurement of Two-Dimensional Unsteady Flow Fields

Logan Flaherty (William Lasher), Penn State Behrend, School of Engineering - Mechanical Engineering

Research has been conducted in the past measuring the lift and drag forces on spinnaker sails. After this research, there was an interest in determining if vortex shedding was occurring over those sails. Some preliminary research was done using a plastic model of a spinnaker in a wind tunnel and using hot-wire anemometers to measure the flow field. However, it was soon realized that the three dimensional flow over the sails was quite difficult to analyze and a methodology was needed. To gain a better understanding of how the equipment should be used, the flow was reduced to two dimensions and the flow over a cylinder was analyzed. There are empirical equations that characterize two-dimensional vortex shedding over cylinders, which will allow for a comparison to be made to the experimental data. The comparison will give a better understanding of how the vortex-shedding frequency and magnitude will present itself in the hot-wire anemometer data so it can then be used to analyze the spinnakers.

#### Determining Geometry of Flying Spinnaker Sail Model

Kensaku Matsushita (William Lasher) Penn State Behrend, School of Engineering - Mechanical Engineering

In analyzing sails, research has already been done to determine the forces on a sail of a known solid shape. Unfortunately the aero-elastic nature of actual spinnaker sails causes the shape and forces acting on the sail to be codependent. This codependency makes it difficult to accurately determine the forces or true shape. The intended purpose of this research was to develop a method for determining the final shape of a spinnaker in flight. A model was constructed to simulate the adjustable rigging on a small sail boat. Additionally, a spinnaker model was constructed to simulate a 3-D shape that would behave similarly to a full-size sail. Photographs were taken of the model while flying in the wind tunnel. In determining the coordinates for the sail through these photographs, corrections were made in order to remove issues with perspective. The exact coordinates were determined by comparing the measurements in the photographs with the known grid points that were on the sail itself. Techniques used to determine the geometry included both hand calculations and software.

#### Using DC Electrical Current to Investigate the Enhanced Ductility of Various Aluminum Alloys

Daniel Mauck (John Roth), Penn State Behrend, School of Engineering - Mechanical Engineering

Previous research has shown that applying a DC electrical current to materials enhances their ductility, allowing them to be deformed more easily. There was interest in determining the specific effects on 5754 Aluminum in tension. Ford Motor Company was specifically interested in both the enhanced ductility and any microstructural effects resulting from the use of high amperage DC currents to deform the aluminum. It was determined that the electrical current did increase the ductility of the 5754 Aluminum, allowing it to be stretched further in tension than it would be without the applied current. After testing, samples were also analyzed for any microstructural defects. Microstructural voids were of particular concern as an increased number of voids can cause the material to be weaker. After analysis, it was determined that the use of DC current to deform 5754 Aluminum causes less microstructural voids than are normally found when current is not applied.

#### Analysis of Effect on Thermoplastic Properties after Cryogenic Treatment and Normalization

David Tullai1 and Benjamin Dibble2 (Dean Lewis1 and Martin Dropik2), Penn State Behrend, School of Engineering - 1Mechanical Engineering and 2Plastics Engineering Technology

This study investigates tensile and impact property changes of polymers after cryogenic treatment and normalization to room temperature. Amorphous and crystalline specimens were subjected to multiple durations and cooling rates, then reviewed for statistically significant shifts in properties compared to a control group. Statistical analysis of standard materials testing results show that the modulus of semi-crystalline materials tended to decrease after treatment, effectively increasing the elasticity of the material, and the ductility of HDPE and HIPS increased.

### PHYSICS

#### Dynamical Evolution of a Swarm of Debris Launched away from Earth after a Major Impact

Adam Carlisle (Darren Williams) Penn State Behrend, School of Science - Physics

Earth has been impacted by countless objects from space during its past. Here we study what happens to the debris ejected from the Earth after a large impact. A computer code known as Mercury (J.E. Chambers), was used to investigate the material that was lost from the Earth into the solar system due to an impact. Using Mercury, small masses were launched away from the surface of the Earth. The positions and velocities of the small masses were kept track of for 10,000 years. The purpose was to find out the fate of the small masses. It was determined that a portion of the masses that were lost to the solar system eventually come back to the vicinity of the Earth, some even crashed back into the Earth.

#### Enhancing the Fluorescent Properties of Organic Dyes Using Silver Nanoparticles

Andrew Makepeace (Bruce Wittmershaus), Penn State Behrend, School of Science - Physics

#### Accurately Determining Photodegradation Rates of Dyes under Solar Illumination

Kathryn Warner, Paul Fontecchio, and Alex Mooney (Bruce Wittmershaus), Penn State Behrend, School of Science - Physics

### PSYCHOLOGY AND SOCIOLOGY

#### Examining Dieting Behaviors in Women

Elisabeth Desilva (William McGuigan), Penn State Shenango - Sociology

An alarming statistic from the Health and Nutrition Survey states that 64 percent of U.S. adults are overweight and obese. A recent study in the *Nutrition Journal* has shown that 83 percent of college women diet regardless of how much they weigh. The study also reported that 58 percent of women felt pressure to be a certain weight and that the pressure came from themselves, friends, and the media. Examining the dieting behaviors of women can provide important insights on the way we perceive dieting. The current qualitative study investigates the reasons why women feel the need to diet. Data will be collected from a convenience sample of 10 female Penn State Shenango students, all of whom report dieting at least once in their lifetime. Each participant will be interviewed privately and be asked 10 questions related to dieting behaviors. The interview data will be examined for themes, and responses will be compared to previously published studies. Results of this qualitative study will be presented in an informative and colorful poster that will be relevant to college students and health professionals.

#### The Effects of Background Music on Studying

Alicia Dunbar and Bethany Hanus (Jennifer Trich Kremer), Penn State Behrend, School of Humanities and Social Sciences - Psychology

Effective studying habits are a skill required for success in college. However, those study skills may not go far once a student is placed in a potentially distracting environment like a dormitory. This study evaluated the effect of background music on college students’ ability to remember information in a simulated study situation. Male and female participants from Penn State Behrend completed two reading discourse tasks (each including subsections of the GRE and SAT); once while in silence, and once while listening to music of their choosing. Researchers also assessed personality, musical experience, and musical genre of songs participants selected. Data were analyzed using a 2 (condition) x 2 (gender) x 2 (personality) x 2 (musical experience) analysis of variance. Results showed no significant interactions. Statistical differences were found for personality such that introverted participants scored higher than extroverted participants during the reading discourse tasks, regardless of condition or musical experience.

#### Electoral Politics

Mark Durst (William McGuigan), Penn State Shenango - Sociology

Electoral politics are currently dominating the media, on television and in print. Major polls predict broad voting patterns. Little is reported on an individual level as to why people vote the way they do. This current qualitative study investigates this issue and seeks to answer the following questions. What key issues influence choosing a candidate? Is there a sharp line that divides the parties, or are certain issues more important in a voter's decision-making process? Do independent voters tend to lean towards one party or another, or do they also vote based on certain key issues? A series of one-on-one interviews will be conducted with a maximum of 20 adult Penn State Shenango students. Participants will be limited only by age (must be 18 or older) and must be registered voters at the time of the interview. Participants will be asked 10 questions and allowed to expand on their responses. All interviews will be tape recorded for later qualitative analysis.

#### A Qualitative Study of Consumer Behavior among NASCAR Fans

Randy Ebert (William McGuigan), Penn State Shenango - Sociology

Quantitative studies have established that it is profitable for many companies to become involved in NASCAR. The purpose of the present research is to uncover qualitatively how corporate involvement in the sport affects the behaviors of NASCAR fans. Unlike other sports, NASCAR is almost wholly dependent on large-scale corporate support. In this study, NASCAR fans will be interviewed at length to determine to what degree their behaviors as consumers are affected by corporate involvement in the sport, as well as changes in the sport (i.e. sponsorship deals, etc.). The purposeful sample will consist of approximately 12 adult NASCAR fans who will be interviewed at length and in depth as to their support, interest, and feelings toward NASCAR, as well as the relationship between their brand loyalties, consumer behaviors, and purchasing choices. Based upon previous pilot studies, it is expected that for most people, corporate involvement is vital to the survival of the sport, and they will change their consumer behaviors accordingly to support their favorite drivers, teams, and sport.

#### Cyberostracism: The Immediate Psychological Effects of Rejection and Ostracism

Chelsea Ehret, Ashley Albeck, and Lauren Humes (Jennifer Trich Kremer), Penn State Behrend,

School of Humanities and Social Sciences - Psychology

Ostracism and rejection have been known to play an important role with issues such as prosocial and antisocial behaviors, self-esteem, and a sense of belongingness (Williams, 2007). Cyberostracism has been a current issue in the field of psychology, and because of its detrimental effects on society, further research would be beneficial to improve the current conditions with the use of electronic communication. In the current study the effects of ostracism and rejection will be manipulated online with a paradigm called Cyberball, in which participants will engage in an online ball-toss game. Participants are going to be randomly assigned to three variable groups. One group of participants will be assigned to a control group consisting of no variable manipulation. The other groups will be assigned to an inclusion or exclusion variable group. After engaging in Cyberball, participants will complete a post-test measure which assesses different domains of emotional stability including belonging, control, self-esteem, meaningful existence, and mood. We expect that our results will be statistically significant; indicating participants that were rejected via Cyberball will report lower levels of self-esteem and belongingness on the post-test measure.

#### Neonaticide: Is Safe Haven an Answer?

Koann Eicher (William McGuigan), Penn State Shenango - Sociology

Neonaticide, or the murder of newborns in the first 24 hours of life, is on the rise. There are between 150 and 300 babies abandoned each year, putting the lives of the infants in extreme danger. In most cases, the result is death. In response to this crisis, Safe Haven Laws have been imposed in 48 states, including Pennsylvania. The purpose of the Safe Haven Law is to provide an alternative to abandonment or murder, by providing mothers the safe, legal, and anonymous relinquishment of their unwanted newborns. Besides benefiting the mother and child, Safe Haven Laws could also save tax dollars by removing the high costs to prosecute these mothers. To date, little research has examined human service workers’ knowledge of the Safe Haven laws. To address this, the present qualitative study will interview 10 human service administrators with the intent to promote interest and knowledge in the law. Interview data will be examined to see if there is a need for more information of the Safe Haven Law in the human services field.

#### Cyber-Affairs: Virtual Fantasy or Infidelity

Deborah Flaugher (William McGuigan), Penn State Shenango - Sociology

Internet chat rooms have escalated to millions of users, presenting many new and unique opportunities. A controversial issue is the recent phenomenon of on-line chat rooms catering to married individuals who feel the need for flirting. Individuals explicating these Internet chat rooms can have the benefit of marriage and the excitement of the dating scene simultaneously. The question is whether it is considered infidelity, or harmless fantasy. It is essential to investigate the cultural impact of this growing phenomenon and how it is influencing couples’ relationships. To date there is a paucity of qualitative research on this topic. Most studies have relied on the quantitative analysis of online surveys, usually involving individuals whose on-line flirting had never been discovered by their real-life partner. Currently little is known about the repercussions experienced by individuals that were discovered by their partner having cyber-relationships in the chat rooms. The current descriptive qualitative study uses content analysis to examine the discourse between chat room participants and identify their attempts to neutralize the stigma of being married but flirting.

#### The Effects of Marital Conflict and Sibling Relationships and Their Effect on Relational Aggression in Peer Relationships in College Students

Caitlin Gildea, Cara Jones, and Colin Sears (Charisse Nixon), Penn State Behrend, School of Humanities and Social Sciences - Psychology

In past years there have been many researchers who have begun to focus on relational aggression and its effects on children and young adults. Due to its influence on children’s social behavior, marital conflict is an important factor in studying relational aggression. Sibling relationships can also have an influence on learning social behaviors. This study examined the relationship between marital conflict, sibling relationships, and relational aggression in a peer context. We hypothesized that students whose parents had negative marital conflict styles (e.g. dragging their children into the middle) and negative sibling relationships (e.g. non-supportive and cold), then there would be more relational aggression used in peer relationships. Participants were 145 undergraduate college students. Results demonstrated that males were more likely to be involved in marital conflict triangulation and were more likely to use relational aggression with peers. No relationship between marital conflict triangulation and relational aggression was found for females. Implications of these results will be discussed using the social learning theory.

#### Reducing Gender Differences in Spatial Skills: The Influence of Stereotype Threat

James Hodge1, Jessica Schubert1, Kaylee Curilla1, Danielle Wilson1, and Janice Jerome1 (Dawn Blasko1, Jennifer Trich Kremer1, and Kathryn Holliday-Darr2), Penn State Behrend, 1School of Humanities and Social Sciences and 2School of Engineering - Psychology

Many careers such as engineering and architecture involve the need for high spatial performance, however, many people lack this ability to manipulate situations and shapes in their minds. One of the factors that influences this performance is one’s stereotypes and anxieties about whether they have the capabilities to excel on this type of material. One of the reasons that women may perform more poorly than men on some spatial tasks is that these skills are stereotypically thought to fall in the male domain. According to Stereotype Threat Theory (**Steele & Aronson, 1995)**, if these self-stereotypes are activated, then performance may decline **(Steele, 1995). The current study examined the effect of stereotype threat on spatial performance. Male and female participants were randomly assigned to a stereotype threat (“males typically perform better on this task”) or control condition. All participants completed a mental rotation task on the VIZ Web site as well as questionnaires about spatial experiences and attitudes. Surprisingly, women under stereotype threat performed more slowly than in the controls but their accuracy increased to levels equal to the men.** Since previous studies used timed tasks, we added a 10-minute time limit to Experiment 2. This may increase stress and reduce the chances that they will use the slower but more accurate strategy that the women in Experiment 1 seemed to foster.

#### An Interdisciplinary Project for Training Spatial Skills in High School and College Students

Mike Horning1, James Hodge2, Tessa Mackey2, and Megan Miller2 (Dawn Blasko2, Jennifer Trich Kremer2, and Kathryn Holliday-Darr1), Penn State Behrend, 1School of Engineering and 2School of Humanities and Social Sciences - Psychology

Spatial skills are shown to be especially important in science and engineering. However spatial skills are not a standard training component of K-12 curricula. This project was an extension of the VIZ project, an interdisciplinary project designed to assess and train spatial skills (Blasko, Holliday-Darr, Mace, & Blasko-Drabik, 2004). The first training program was completed in summer 2007 with a group of incoming high school seniors participating in the MCE/WISE program. Students completed four training modules consisting of software and textbook exercises and hands-on games. At the beginning of fall 2007, a spatial assessment of all incoming mechanical and plastics engineering technology first-year students was conducted using the VIZ Web site. Students performing below the 60th percentile were invited to a supplemental class designed to improve their spatial skills. This class was divided into two periods. During the first period students completed a series of software modules, textbook problems, and assessment surveys. The second period focused on interactive training activities using games designed by previous VIZ teams. For example, the game “Pizza Party” focused on improving way-finding skills. Another game, “Time Bomb” focused on strengthening mental rotation and spatial visualization. Both training programs showed improvement in spatial performance.

#### Examining Trust in Work Teams

Samuel Laskowitz (William McGuigan), Penn State Shenango - Sociology

This study, based on qualitative research, examines the trust levels of members of work teams. Many organizations are implementing work teams to increase the efficiency of organizational initiatives. Within these teams, issues may be present or arise that either foster efficiency or hinder the outcome expected by the organization. Few studies have focused on how organizations implementing work teams can increase efficiency and trust levels among team members. Through the use of an open-ended survey, themes can be generated from the results giving implications for the management of work teams and overall efficiency of efforts towards the organization’s goals.

#### Attitudes Related to Intra- and Interracial Love Scenes

Kerry Lope and Briana Grimes (Victoria Kazmerski), Penn State Behrend, School of Humanities and Social Sciences - Psychology

Individuals are highly exposed to their own ethnicity, allowing them to feel more comfortable with these individuals (Lindsay, Jack & Christian, 1991). Their research suggests that individuals prefer interactions with individuals of similar ethnic backgrounds. This finding could suggest that individuals prefer viewing actors of races consistent with their own when viewing intimate love scenes in film. The current study analyzed attitudes related to same-race, other-race, and interracial love scenes in film. Self-report and physiological responses were measured to determine preference. Participants viewed sexually-explicit movie clips portraying same-race interactions, interracial encounters, and a neutral movie. After clips, individuals rated intimacy, comfort, and sexual arousal levels for each. We recorded the participants’ systolic and diastolic blood pressure and their heart rate. After participants completed viewing the movie clips they filled out demographic and sexual experience questionnaires. We discovered that individuals prefer viewing same-race sexual interactions as opposed to interracial. There was no effect or interaction found between movie type on physiological measures. The current research shows that social cognition plays a higher role than biological functioning in determining an individual’s racial preference. These findings may be applied to society to diminish prejudices and discrimination.

#### Ethnic Differences in How Domestic Violence Influences Mothers’ View of Their Infant

Malerie Pacsi (William McGuigan), Penn State Shenango - Sociology

Past studies have shown an association between domestic violence and mothers’ view of their infant. One study found that both mothers and fathers who experienced domestic violence during the first year of child rearing developed a more negative view of their child. The current study reviewed five years of archived data from a voluntary program designed to assist at-risk mothers in giving their first born infant a “healthy start” at life. The data consisted of 384 Hispanic and 1,063 non-Hispanic (White) mothers. Analysis showed that when infants were 12 months of age the 31 Hispanic and 109 non-Hispanic mothers who experienced domestic violence reported a significantly more negative view of their infant than mothers who had not experienced domestic violence. Non-Hispanic mothers who experienced domestic violence showed a significant increase in their negative view of their infant from 6 to 12 months. However, no significant increase in negative views of the child was found for Hispanic mothers who experienced domestic violence.

#### The Psychophysiological Responses of Siddha Meditation Practice When Varying S-Deltas (SΔ) Are Presented to a Yogi

Michael Roth (Jeffrey Hollerman and Carl Olson), Allegheny College - Psychology

The purpose of this study was to study the relationship between various psychophysiological responses (EEG, EOG, heart rate- pulse, and blood oxygen content) to different meditative SΔ (S-Delta) stimuli during Hindu meditation practice, specifically Siddha yoga-meditation techniques with an expert and novice meditator (yogi). Past research has evaluated and researched the impact that many different environmental stimuli have had on the meditative experience of different meditation practices. However, these studies were not concerned with the spiritual experience of the yogi, nor did the researchers explain the reasoning behind why certain stimuli were used with certain meditative disciplines. It is the goal of this study to find what stimulus produced better spiritual effects in the yogi participant vs. the novice participant, and to observe simultaneously what physiological changes occur within the brain. It is hypothesized that the expert yogi participant will demonstrate high alpha and theta power in the primary somatosensory cortex/post central gyrus (S1), while achieving oneness with Braham and the Self. Furthermore, it is hypothesized that with increasing eye focus (low EOG variance) on a particular given stimulus that the yogi will enter a state of moksha (oneness with nature/liberation). Preliminary results have found low EOG variance, decreased heart rate for certain meditative stimuli SΔ, and a greater presence of delta, theta, and alpha band waveforms during meditation when compared to a non-meditator.

#### The Effects of Marital Conflict on College Students’ Adjustment

Andrea Rupert and Nicole Unrue (Charisse Nixon), Penn State Behrend, School of Humanities and Social Sciences - Psychology

The current study examined the relationship between college students’ exposure to marital conflict, connectedness, and coping efficacy. College students reported on subscales of marital conflict, coping, and connectedness. Based on the emotional security theory (Cummings & Davies, 1994), we predicted that students’ who were exposed to higher levels of marital conflict would not cope as effectively as students from homes with lower levels of marital conflict. Further, based on past work, it was expected that students connectedness would also relate to coping efficacy. Results indicated that while marital conflict does not significantly affect coping efficacy; both social and campus connectedness were found to be significant predictors.

#### Rap and Hip/Hop, Its Message to Our Young Adults

Jeremy Rupnik (William McGuigan), Penn State Shenango - Sociology

Over the past decade Rap and Hip/Hop has exploded onto the national scene and has become one of the most popular music genres for young adults. Its influence can be seen in how young people dress, the language they use, to the programs that are broadcast on television. Despite its popularity, Rap and Hip/Hop continue to be criticized for their controversial lyrics (profanity) and the “gangsta” lifestyle the music promotes. The current qualitative study uses discourse analysis to provide a detailed examination of the lyrics of several popular Rap and Hip/Hop songs available to the general public. The lyrics will be analyzed for themes to gain a better understanding of the message that this controversial music is promoting. Results of this qualitative study will be compared to the findings from previous qualitative and quantitative research. Results will highlight how a better understanding of the impact of Rap and Hip/Hop music on youth can be used to professionals in the fields of education and counseling.