

Abstracts

Listed by the project identification number by the title

1 Assessing Dietetics Preceptor Usage of Nutrition Focused Physical Assessment (NFPA) Techniques in Evaluating Patients for Care in Long-term and Acute Care Settings

Megan Houk

Malnutrition can significantly increase the cost of treating conditions among acute care and long term care inpatients, and increase risk of developing chronic conditions among the general population. Lab measures of blood proteins are most often used to assess malnutrition but can be misleading with altered hydration status, obesity and latent disease. Nutrition-Focused Physical Assessment (NFPA) employs overt signs of nutritional deficiency, skin integrity, organ function, inflammatory markers, and loss of lean tissue. The objective of this study was to evaluate the use of NFPA skills in various dietetics practice settings. Dietitians were asked about barriers to adoption, progress toward assimilating new malnutrition evaluation protocols, and openness to receiving training. The study was piloted using preceptors for the YSU dietetics programs and then expanded to dietitians belonging to the dietetics organizations in Northeast Ohio. Based on the findings, a clinic to provide training on NFPA for dietitians will be developed.

4 The Nutrition Care Process Implementation and Use in Healthcare Settings by Registered Dietitians

Jenna Governor, Patricia Gawdyda, Taylor Hause

The Academy of Nutrition and Dietetics created the Nutrition Care Process (NCP) as a standardized documentation process for dietitians. Currently, the NCP is not mandatory for Registered Dietitians in any practice setting. NCP uses a standardized process with standardized language for diagnosis and dietetics interventions. The purpose of this study was to determine if the NCP is being implemented. The study sought to understand dietitians' perceptions of NCP and gain awareness of why the process is not being widely implemented. An 18-item survey gathered demographics, medical nutritional therapy documentation methods, and barriers to adoption of NCP. The survey was emailed to 300 Registered Dietitians in acute, long-term and community settings in Northeast, Ohio. We anticipate that barriers to the NCP will be better understood and overcome so that dietitians can provide higher quality care, which can lead to more dietitians' services being reimbursed.

5 RELICS OF SLAVERY: AN INVESTIGATION, REVIEW AND COMPARISON OF POST-REVOLUTIONARY WAR VERNACULAR SLAVE ARCHITECTURE IN AMERICA AND ON SAN SALVADOR ISLAND, BAHAMAS

Richard Schumacher

Relics of Slavery explores and compares post Revolutionary War vernacular slave architecture in the American South and on San Salvador Island in the Bahamas. The evacuation of British Loyalist from the American Colonies to the Bahamas involved the transportation of the Loyalists, their possessions and their slaves to the Bahamas and elsewhere. As such the slave quarters built by the slaves themselves in South Carolina, Georgia and Eastern Florida should be similar to slave quarters on San Salvador Island in the Bahamas, subject to the building materials available. Architectural remains from both areas of study are compared in the following ways. First floor plans of slave housing will be compared. Second the arrangement and positioning of slave housing in relationship to the manor house is explored. Finally, the slave architecture on the island plantations is compared..

9 YSU Lincoln Parking Deck: Analysis of traffic flow patterns

Jennifer McAnallen, Kevin London, Jason Huey, Nico Minniti, Anthony Hill, Blake Walker

For this year's Quest Competition we are going to do phase one of two. Our group has decided to analyze and make a simulation of the overflow of traffic in the Lincoln parking deck on the campus of YSU. To do this, we have gathered data from YSU's Parking services and University Facilities. We created an auto-CAD drawing so that we explain the flow in and out of the parking deck. Using the data from the YSU parking services, we are able to determine when the parking deck has reached its capacity. Also, we used the data to simulate a model using ARENA software. Next year, we will begin phase two by trying to work out sensors or counting a more accurate data collection and compare our results with phase one.

10 Sweet: Taste perception and artificial sweeteners

Jessica Romeo, Allison Shay, April Michael, Cricket Murray

Consumption of sweet products often correlates with greater preference for sweetness (Mahar & Duizer, 2007). Artificial sweeteners are FDA approved food additives that duplicate the taste of sugar and provide fewer calories. They have become increasingly popular, but controversial due to consumer demand for weight-management and diabetes friendly sugar replacers. The objective of this study was to explore the perception of sweetness from natural and artificial sweeteners. Participants were recruited from general education classes at YSU, with the instructor's permission. An 18-item questionnaire asked subjects to self-report perceptions about natural and artificial sweeteners, as well as usage. It was anticipated that participants who regularly used artificial sweeteners would have an increased preference for sweetness. Female participants were also expected to use artificial sweeteners more than males. Certain factors like smoking, health awareness and self-reported disease were also expected to impact perception of sweetness.

14 Developing customization and complexity scales for additive manufacturing products

Ashley N. Martof, Lauren M. Rodomsky, Caitlyn M Rodomsky, Dakesha C. Jordan, James W. Limperos

There is a great amount of attention around additive manufacturing, also known as 3D printing. Businesses want to know when it is appropriate to use 3D printing for their products. A reference system can be developed by taking the key attributes of a manufactured product: complexity, customization, and volume. In order to use this tool, scales are needed to describe a product's complexity and customization. The team determined attributes of customization and developed a six level scale. The team also designed parts with increasing complexity resulting in lighter weight. Parameters such as surface area per volume and number of mesh facets per volume were evaluated for use as complexity scales. Both customized and complex parts were printed using selective laser sintering (SLS). The team collaborated with America Makes, Penn State, University of Texas El Paso, and The ExOne Corporation.

19 Rating NFL Teams with "Point Spreads"

James Munyon, Drew Saluga, Michael Seifert, Timothy Shreeve

NFL team data from the 2013- 2014 regular season was used to attempt to create a rating system for the teams that reflects scoring differences between pairs of teams when they played each other. These point spreads are different than the point spreads that people in the betting world are familiar with, which are designed to maximize betting activity and bookmaker profit, not to accurately predict game score differences. We instead are interested in team ratings reflecting team scoring differences as closely as possible.

21 Green Energy

Ryan Melichar, Chad Piccirilli, Ahmad Omisat, Paul Weidle, Josh Hobby , Josh Henson

Green energy has been an extremely popular area of talk recently. We feel that in order for the human race to become less dependent on fossil fuels and to do any further damage to the Earth, we as a whole,

need to rely on clean, sustainable energy production. We feel that nuclear, solar, and wind and water energy production are the best choices for us to acquire energy for the world's needs. During our presentation, we plan to go in depth with how each of these processes acquire energy, how they are good for the environment and even explain a few negative effects that each produces. Also, as a group we prepared a small demonstration of how our green energy will feed into the electrical system. During our presentation we will go in depth of each of the processes and show you that green energy is the future.

24 Comparison of Multiple Daily Injections VS Continuous Subcutaneous Insulin Infusion in Treatment of Type 1 Diabetes Mellitus

Maribeth Schiavone

The objective of this presentation is to compare the difference in outcomes of two treatments for type 1 diabetes mellitus. For years, the gold standard of diabetes medical treatment was multiple daily injections (MDI), which involves one or two injections of an intermediate or long-acting insulin, plus bolus injections of fast or rapid-acting insulin with meals for blood glucose correction and carbohydrate coverage. As technology had advanced, continuous subcutaneous insulin infusion (CSII), or "insulin pump" was created to more closely mimic a true pancreas. These devices, which are worn outside the body and attached to a subcutaneous catheter, infuse rapid-acting insulin continuously at a basal rate, eliminating the need for a separate injection of basal insulin. They can be manually programmed to infuse bolus doses of the same insulin for blood glucose correction and meal coverage. Methods used to compare the two treatment options include a compilation and analysis of case control studies, randomized clinical trials, retrospective studies, open-label randomized crossover studies, randomized open parallel studies, and systematic reviews, all from professional journal articles published in the last five years. Research has shown that CSII is more effective in lowering hemoglobin A1C, which measures the average plasma glucose level over time, as well as fasting and post-prandial glucose. It decreases total daily insulin requirements and hypoglycemic episodes. Overall, evidence suggests that CSII provides tighter glucose control, thereby improving the health and quality of life of patients and reducing the risk of diabetic complications.

25 The Pen-Pal Project: Assessing the Effects of Interscholastic Pen-Pal Correspondence on the Writing Development of Elementary School Students.

Megan Evans

Literature from the fields of writing studies, literacy acquisition and development, and language arts pedagogy address the impact of interscholastic correspondence on the skills of beginning writers. This project aims to follow the writing progress of a group of fourth- and fifth-grade students from Warren Harding Elementary, Warren, OH, as they engage in an ongoing year-long pen-pal correspondence project with students of the YSU Honors' Program. In particular, this presentation of the study will take as its primary foci the following: expanding and applying the taxonomy and rubric originally developed by Ceprano & Garan (1998) as part of their "Emerging Voices in a University Pen-Pal Project," discussing project design and implementation, and reporting on preliminary data analysis.

28 Women's Health Education in the Tri-County Area

Sabrina Long, Emily Clark, Allison Armeni

Entitled Women's Health Education in the Tri-County Area, this senior honors thesis is a community health project with the objective of furthering women's education in sexual health. Various women's health agencies in the Columbiana, Mahoning, and Trumbull counties were contacted to determine the educational needs of women in these areas. The most prevalent topics among these agencies were identified as a lack of knowledge in contraceptive methods, sexually transmitted diseases, and prenatal care during pregnancy. Evidenced based research and review of the current literature on these topics lead to the development of teaching materials in the form of pamphlets, posters, and tangible models.

These teaching materials were presented back to multiple women's health agencies in the previously stated counties in the form of lecture presentations. As evidenced by confidential client evaluation questionnaires, this honors thesis resulted in the education of women in the community and the correction of the aforementioned sexual health knowledge deficits.

30 Environmental Evaluation of Submerged Debris on the Reefs of San Salvador Island, The Bahamas

Jessie Keeler, Elizabeth Johnson

The objective of this study was to evaluate the composition and quantity of marine litter found around San Salvador Island in the Bahamas. The goal was to provide an up-to date survey on the current condition of the coral reefs in San Salvador and collect valuable data for research that could be completed in the future. Previous research focused on beach debris of San Salvador, but sparse data exists describing the magnitude of trash on the surrounding coral reefs. Additionally, the researchers strove to compile enough data to determine potential causes for the coral cover decline; this information was gathered in anticipation of the development of an effective rehabilitation plan for these vital ecosystems. A team of researchers evaluated both the beach and underwater environment in 10 meter intervals, photographing and logging the litter found. Coral reefs off of the island's north, south, east, and west shores were examined and compared to the analogous beaches. The results of this study determined that it was more probable to find litter on the reefs when adjacent beaches contained high concentrations of debris. However, the quantity of marine litter exhumed on near shore reefs was limited compared to the amount on the equivalent beaches. Limitations to the study prevented researchers from a more comprehensive comparison, but the research serves to provide a baseline and a direction for further studies.

32 Methods Engineering Analysis and Work Design at Brainard Rivet to Improve Parts Handling and Packaging

Joseph Waltemire, Ashley Bowers

Brainard Rivet is a company specializing in the manufacturing of rivets, pins and fasteners which are used in the metalworking, farm, railroad and auto industries. Two Industrial and Systems Engineering students evaluated the packaging process using techniques acquired in the Methods Engineering Class which includes time and work study and motion analysis. The time study allowed the utilization of video based documentation to record the process and distinguish between the pros and cons of the packaging system. Using the analyzing tools MTM-1, MTM-2 and MOST, the team attempted to improve the way the boxes were constructed and the general movement of the packaged boxes. The time study allowed the team to interact with the industry and propose their ideas from their industrial engineering curriculum.

33 Improvement of Work Design at Altronic, LLC

Jessie Tuscano, Ahmad Al-Ahmad

A team of industrial engineering students performed a time study at Altronic, LLC in Girard, OH, a high-quality manufacturer of ignition systems. The team analyzed the assembly and packaging of an ignition coil. The authors of this presentation performed this time study in order to complete a requirement of the Industrial Engineering curriculum as well as present at QUEST. Modern time study software was used to analyze the productivity and worker technique of the assembler. Further methods of human performance were utilized to analyze the study, such as MTM-1, MTM-2, and MOST. From conclusions drawn by the authors from a calculated operation process chart and a flow process chart, suggestions for optimization of the ignition coil assembly process were recommended.

34 Work Measurement, Analysis and Redesign for an Industrial Process at a Ceramics Hydroforming Facility

Stephen Senediak, Bryan Ray

Two industrial and systems engineering students went to Specialty Ceramics Incorporated in Columbiana, Ohio. The process of cutting panels into uniform sized strips was studied. The students performed a time study using video to analyze and look for ways to potentially improve the efficiency of the worker performing the process. The students also used other methods for determining how long the process should take, such as MTM and MOST. They also looked for ways to potentially improve the efficiency of the process and propose to the company a way to redesign the process for greater efficiency.

36 Analysis of Manufacturing Operations at Gasser Chair to Improve the Processes and Establish Time Standards

Samuel Finocchio, Nick Vitucci, Chelsea Malone

A team of Industrial Engineering analysts examined a manufacturing process to develop a time standard with the cooperation of management and operation leaders of Gasser Chair in Youngstown, Ohio. Gasser Chair Company is a local industry leader in the design and manufacturing of custom chairs. The study utilized principles found in the Industrial Engineering Methods course including the application of computer-based video analysis. Using this analysis tool, the team identified the individual elements of the process. Once identified, the authors determined the proper performance rating factors and allowances. Thus the time standard was established for the process as it is presently performed. Then predetermined time systems such as MTM-1, MTM-2, MOST, and Quicktimes were used to obtain the time standard for comparison to the video-based results. Using these tools, the team was able to gain practical experience in motion and time study of an actual industrial process. These principles and techniques allowed the team to perform work analysis and work design to propose improvements toward achieving optimal efficiency. Experience gained by conducting this study not only included the techniques described above but the communication skills required to successfully work with all different aspects of a company.

40 Six Sigma Analysis (DMAIC) of a Metrology Process at M-7 Technologies

TaiJaune Robinson, Dakesha Jordan

A team of future industrial engineers gained the cooperation of the shop floor management to Define an opportunity for improvement of a metrology process at M-7 Technologies in Youngstown, Ohio. The aspiring industrial engineers conducted a time & motion study as a part of the Methods Engineering laboratory course. This was accomplished by using a computer-based video analysis program to capture the worker's present efficiency level. Using pre-determined time systems such as MOST, MTM-1, MTM-2, and Quick Times, comparisons were made to the computer-based time study. This study's focus was to Measure, Analyze and Improve the metrology procedure for collection of bearing bore data and toward assurance of proper installation and maintenance of refurbished gearboxes in the field. The authors analyzed the procedure and the efficiency of the operator by first recording the process. Once the process done by the operator was recorded, the team was able to identify standard times for each repetitive operation. Utilizing a computer-based video system and using both visual and micro-motion analysis, the team identified fundamental motions. Analyzing the results of the time study, the team was able to investigate the possibilities for meaningful improvements. The team expects to continue working with M-7 Technologies and follow through with the implementation of the improvements and participate in planning and analysis of maintaining it in Control.

51 Regenerative Braking for Motor Vehicles and Freight Trains

Dakota Joy, Justin Getz, Brandon Mirto, Sasha Monroe, Jenna Wise

In this study, the economics of regenerative braking were studied for both motor vehicles and diesel electric powered freight trains. Previous studies have concluded that storing and reusing the energy generated by dynamic braking systems may be cost effective in passenger cars, but this technology does not produce sufficient cost savings in a diesel electric locomotive to justify the required initial investment.

However, the rising cost of diesel fuel, as well as more recent data on the “social cost” of greenhouse gas production, causes us now to question these earlier conclusions.

56 Design and Traffic Analysis of a Rural Shopping Center Parking Lot

Kevin Ball

Proper parking lot design is very important in the development of commercial land. The goal of this project is to design a parking lot to fulfill the needs of a fictitious 50,000 square foot shopping center housing 12 businesses located in rural Mercer County, Pennsylvania. Designed elements include: vehicle capacity, space dimensions, entrances/exits, orientation, lighting, and signage. In addition to the design of the parking lot, a traffic study was conducted to predict the increase of traffic volume on roads in the vicinity of the proposed shopping center. This effort provided the fictitious shopping plaza with an efficiently designed parking lot with a well-estimated impact on surrounding traffic.

58 Arduino Controlled Laser Etcher

Patrick Hyden, Kyle Spickler, Brennen Morrison, Nick Buffa, Patrick Bollinger, Matthew Pilch

The purpose of this project was to successfully produce a user-friendly LASER etcher capable of burning an uploaded image into a piece of wood or paper. The image is uploaded to an Arduino microcontroller, which has been programmed to read the picture as a binary array. This binary array gives position and color (black or white) of each pixel in the picture. Using the microcontroller, stepper motors, drivers, and a 2000mW 445nm LASER diode, the printer is able to burn pixels along an X-Y coordinate system in quick succession. This technology can be easily modified to LASER sintering capabilities. LASER sintering melts powdered plastics and metals in focused regions to “build” a computer-designed part. The technology incorporated into this LASER printer is the same technology found in additive manufacturing techniques.

65 Calculating the Energetics of pi-pi Interactions between Aromatics and Fluoroaromatics

Kristen Jo Hernandez

Metal Organic Frameworks, MOFs, are porous metal coordination complex frameworks that are capable to absorb small molecules within the voids created by the open framework. Directional interactions, such as hydrogen bonds or $\pi\cdots\pi$ stacking interactions, between the absorbed molecules and the framework can lead to preferential absorption of some molecules over others, which could be used to separate and fraction otherwise difficult to separate complex mixtures of compounds. $\pi\cdots\pi$ stacking interactions between fluorinated and non-fluorinated aromatics are known to be especially strong [1], [2], [3]. To model possible selective adsorption of fluorinated aromatics on MOFs featuring aromatic linkers (or vice versa), the interactions of aromatic with various fluorinated aromatics was modeled in the gas phase using quantum mechanical calculations. Preliminary calculations on individual molecules were performed using the Gaussian03 package. Predictions of the energetics and molecular interactions between π -stacked molecules will be performed using Gaussian09 and will be conducted at the Ohio Supercomputer Center.

1) Reichenbächer, K., Süß, H. I. & Hulliger, J. (2005). *Chem. Soc. Rev.* 34, 22–30.

2) Bacchi, S., Benaglia, M., Cozzi, F., Demartin, F., Filippini, G. & Gavezzotti, A. (2006). *Chem. Eur. J.* 12, 3538–3546.

3) Cozzi, F., Bacchi, S., Filippini, G., Pilati, Tu. & Gavezzotti, A. (2009). *CrystEngComm* 11, 1122–1127.

66 Nanoflowers

Jennifer R. Miller, Matthew J. LaLama, Brian J. Stahl, Darian E. Wilson, Paije M. Kiraly

The purpose of this experiment was to grow microscopic carbonate structures called “nanoflowers.” Different nanoflower structural patterns grow by varying the growth conditions. [1] In order to test the

scale of the versatility of the experiment for use in undergraduate and high school environments, multiple samples were prepared and analyzed using different setups and growth conditions. In the first sequence of the experiment, samples were prepared using basic conditions (pH 12-13), controlled carbon dioxide (CO₂) flow, sodium metasilicate (Na₂SiO₃), and either barium chloride (BaCl₂) or strontium chloride (SrCl₂). Subsequent analysis using both optical and electron microscopy determined that BaCl₂ grew favorably and consistently, while SrCl₂ showed no growth. The second sequence of the experiment involved further testing of BaCl₂ samples. Samples were prepared using the same conditions as sequence one, but the environments' pH levels were varied (pH 7-11). Subsequent analysis determined that samples prepared in pH 8-9 showed favorable growth, and achieved different growth patterns than in sequence one.

- 1) Wim L. Noorduin, Alison Grinthal, L. Mahadevan, Joanna Aizenberg, "Rationally Designed Complex, Hierarchical Microarchitectures," *Science* 2013, 340, 832-837.

69 Monitoring Indoor Air for Potentially Hazardous Particulates

Rae'ven Crum, Vincent Pilloli, Kaylin Camp, Amanda Seidler, Ralph Roth

Metallic dust suspended in breathing zone air was evaluated in a classroom, conference room, working laboratory, newly constructed laboratory, and a machine shop in Moser Hall at Youngstown State University. Vacuum pumps sucked 20 liters of air per minute for 24 hours through cassettes where dust was trapped onto filter papers. Particulates were analyzed using an x-ray fluorescence spectrometer (XRF, yellow filter, 40 kV and 10 µa). The spectrogram peaks allowed identification of the metals and indicated relative amounts in counts per second using XRF manufacturer-provided software. A blank filter paper was analyzed for background. Results for the classroom, the conference room, and the working laboratory (fume-hood exhaust fans running) were identical to the blank filter, indicating no elevated levels of metallic particulates in those areas. It was expected that the machine shop, used to fabricate metal parts for laboratory apparatus, would show elevated levels of metallic particulates; these levels were observed, especially with a high peak of iron. Not initially anticipated were elevated levels of metals in the newly constructed laboratory. The construction, however, included sawing gypsum wallboard (calcium), cutting and connecting wiring (copper and zinc), and drilling through reinforced concrete floors and walls (iron, and other metals). As these fume-hood exhaust fans were not being used, particulates from the construction were not yet vacuumed from the air in this new facility. No lead, mercury, cadmium or other metals of serious health concerns were identified in any the areas. Manganese, which can present health problems, was present in relatively low amounts.

71 Development of a PCR-Based Assay to Detect *Penicillium marneffei* in Insects

Kristin LaTessa, Kayla Coldsnow, Jamielynn Doyle, Jason Gilmore, Sara Johnson, and Kristin Latessa

Penicillium marneffei is a pathogenic fungus endemic solely to Southeast Asia. The fungus infects humans, mainly those who have developed AIDS. The fungus is also found in bamboo rats, but there is no evidence to suggest that the disease is transmitted from rats to animals. In fact, the exact reservoir of *P. marneffei* is unknown despite decades of investigations. We hypothesize that insects may be the carriers of this infectious disease agent. To assess this hypothesis, we must first develop molecular methods to detect *P. marneffei* in insects. Our current efforts are directed towards developing a PCR-based detection system for *P. marneffei* using previously published procedures. Once established, this assay will be tested in wax moth larvae infected with *P. marneffei*. The results of the PCR protocol will be compared to traditional culture methods of identification.

73 The Effects of Environmental Cross-Over on Inflammation-Induced Nociception

Jillian Armentrout

There are many studies in which environmental enrichment (EE) has focused on modifying behavior leading to improved cognitive functions, such as learning and memory. There are also increasing numbers on how EE positively affects a subject's pain tolerance by increasing thresholds. In order to

better understand how an environment can affect nociceptive behaviors, this study looked at the effects of cross-over from one environment to another after induced inflammation. Subjects were initially randomly assigned three to a housing environment; four of the housing environments were standard, only containing bedding and food/water, while the other four were supplemented with toys (enriched). Baseline behavioral measurements, paw thickness, paw withdrawal latency (PWL) and paw withdrawal threshold (PWT) were collected. After five weeks, inflammation was induced and the cross-over was conducted. Two of the initial standard housing environments stayed standard, while the remaining two standard environments changed to enriched. Two of the initial enriched housing environments changed to standard, while the remaining two enriched environments stayed enriched. The behavioral measurements were then conducted post inflammation at 2 hours, 7 days, 14 days, 21 days, 28 days, and 35 days. Paw thickness was significant, showing that the inflammation was actually produced. PWL and PWT both showed no difference among groups and PWT also showed no difference among testing times, while PWL did show a difference among testing times. Paired T-tests were also conducted between baseline/2 hours post, baseline/14 days post, and baseline/35 days post for thickness, PWL, and PWT. Baseline/2 hours, baseline/14 days, and baseline/35 days for thickness all revealed a value of 0.000, showing a significant difference between baseline paw thickness and paw thickness immediately (2 hours), 2 weeks after, and 5 weeks after induced inflammation and the cross-over. Baseline/2 hours for PWL showed a significant difference in PWL behavior 2 hours after induced inflammation, along with baseline/35 days. Baseline/14 days for PWL, though, did not show significance. Neither baseline/2 hours, baseline/14 days, nor baseline/35 days showed values of significance for PWT.

74 Permeability of Oxygen Through a Semi-porous Membrane

Eric Schubert, Antonio DiSalvo, Kyle Bryan

The permeability of oxygen through a polydimethylsiloxane membrane was measured using an apparatus constructed at Youngstown State University. The flux of oxygen was found to be linearly proportional to the oxygen mole fraction driving force across the membrane and inversely proportional to the membrane thickness.

75 The Smart Grid

Jeffrey Wormley, Laura Corson, David Peterson, Josh Foor, Fahad Alotaibi, Mike McGarvey
Join us to learn about the Smart Grid. Whenever there is a power outage everyone starts talking about the Smart Grid. Our presentation will explain what the Smart Grid is, how it works, and why we need it. We will cover the costs associated with implementing and maintaining the Smart Grid. Implementing a Smart Grid brings additional security challenges. We will address those challenges and how they will be dealt with. Our presentation will conclude with the where the Smart Grid will head in the future.

78 Process and Plant Design for the Manufacturing of the Influenza Vaccine Using CHO and Insect Cells

Sean Gabriel, Samantha Tharp, Nicholas Ragan

The influenza virus is a global concern that affects many individuals and can have significant impacts on people's lives. Traditionally the influenza vaccine has been manufactured through chicken eggs, which is a proven and accepted process. Unfortunately the egg method has drawbacks. One of those drawbacks includes people with allergies to eggs who cannot take the vaccine. The other drawback is in the case of the chicken egg supply becoming unavailable due to a bird flu outbreak. Recently alternative methods have been developed. These methods are the vaccine production through Chinese hamster ovary (CHO) cells and insect (Sf9) cells. Both methods were evaluated on an economic basis and it was determined which method was the most cost effective choice. After this initial determination, a process and plant design was constructed to best manufacture the vaccines for mass quantities and to make a profit in the process.

84 Work Measurement and Proposal of Improvements of Gearbox Refurbishment at M7 Technologies

Leo Daprile, Joshua Wakeford

A team of Industrial Engineering students conducted a time study of gearbox refurbishing operation at M7 Technologies located in Youngstown, Ohio. This time study was conducted in accordance with the Methods Engineering, a course that serves the foundation of the Industrial Engineering curriculum. The team observed the critical process step of polishing the inner walls of a roller bearing. The process was captured and recorded using a computer-based video analysis system. Using the video analysis software, the standard elemental times and overall standard cycle time was determined. The team then used the classic and analytical techniques of MTM-1, MTM-2, and MOST to generate standard cycle times for the elements and an overall standard time for comparison to the modern computer-based video results. The team had an opportunity to conduct a complete methods study and then presented criteria on which the process may be improved.

86 Work Analysis of Ceramic Fiber Sanding Process at Fireline Inc

Mary Cherrington, James Limperos, Patrick Kiraly

A group of three Industrial Engineering students examined a work process at Fireline Inc, of Youngstown, Ohio. A time study was conducted in connection with the Methods Engineering class of Dr. Martin Cala, and designed to tie community outreach into the curriculum of the Industrial Engineering Program.

This activity required the students to reach out to a local industry and work with management and production personnel in order to record a work process. The process of sanding a Thermocouple Insulator was filmed and analyzed using a computer analysis software. Methods Engineering tools such as MTM and MOST were also used to verify a standard time for the process. Students also utilized computer software to analyze each motion of the process by determining essential and non-essential movements.

Beyond the initial analysis, students had the opportunity to analyze the essential and non-essential Therblig elements in order to make suggestions about the process. Flow charts and plant layouts were also used in the final analysis of the total process.

88 The effect of media on social appearance anxiety and disordered eating.

Erin Crist

The mass media has reluctantly been blamed to be a very large contributing factor to negative body image, especially in adolescents and young adults. Many adolescents and young adults, mainly female, may form attachments to those in the mass media, such as celebrities, especially those who are of the same age. Comparisons between the adolescent and the celebrity are often created, leading to celebrity worship and now viewing the celebrity as their social ideal self (Giles & Maltby, 2004). If the ideal body image is not reached, this may lead to appearance dissatisfaction. The media and fashion industry often presents images that are distorted or digitally altered, allowing young adults to become confused about whether or not the images they are seeing are real or not (American Academy of Pediatrics, 2001). This leads to the need to become what consumers see in the media; the images are seen as real-life, but are actually impossible to achieve (Engeln-Maddox, 2006). The purpose of our study was to see the correlation between the mass media and the effects of negative body image and disordered eating in college age students. Male and female students of all ages, majors, and college grade levels were asked questions based on how the media positively or negatively affects their body image. Our research shows that males and females of the college level between the ages of 17 and 66, do show signs of being influenced by the Media for their ideal body image. Although many females who participated in the survey agree that TV is an important source of information about being attractive, many admitted that they do compare their body to those who appear on TV or in the media.

90 Comparison of Uniform and Delta doped p-type ZnO Thin Films

RaviChandra Reddy Gade

The properties of uniform and delta doped p-type ZnO thin films deposited by RF magnetron sputtering from ZnO and Li₃PO₄ solid targets on c-plane sapphire substrates have been characterized. Uniform doping was achieved by simultaneous deposition of the films from the ZnO and Li₃PO₄ targets at 300 oC to a thickness of about 1 MICRO METER. For delta doping, the deposition from the Li₃PO₄ target was blocked every two minutes. Post-deposition annealing was carried using a rapid thermal processor in O₂ at 500 - 900 °C for 3 min. Analyses performed using photoluminescence spectroscopy measurements revealed luminescence peaks at 3.35 and 3.30 eV at 12 K for the uniform doped and delta-doped films, respectively. Hall effect measurements revealed p-type conductivities with average Hall concentrations of 2.71×10^{14} and 2.17×10^{15} cm⁻³ for the uniform and delta doped films, respectively. These p-type conductivities however were unstable and sometimes yielded n-type conductivities with repeated measurements. The fluctuation in the carrier type could be due to the lateral inhomogeneity in the hole concentration or small Hall voltages in the measurements, which can be significantly impacted by even small spikes in signal noise inherent in the measurements.

94 Working Memory Load and Cognitive Test Anxiety in Elementary School Students

Gregory A. Satmare

Test anxiety is composed of two components, cognitive test anxiety and emotionality. Cognitive test anxiety was acknowledged as any cognitive expression of concern about one's own performance (Liebert & Morris, 1967) and appears as the dominant form of test anxiety (Sarason, 1984). The processing efficiency theory explains that cognitive test anxiety consumes space in working memory and interferes with highly test anxious individuals' ability to efficiently process information, thus resulting in decreased performance (Eysenck & Calvo, 1992). Previous research with adults (Darke, 1988; Derakshun & Eysenck, 1998; MacLeod & Donellan, 1993) suggests that increasing working memory load has detrimental effects on highly test anxious individuals' performance. While it is logical that this is also true with children, no known research has examined this relationship. That is the purpose of this study: to explore the interaction between working memory load and cognitive test anxiety in a group of elementary school students.

96 Duloxetine Hydrochloride(Cymbalta) for Fibromyalgia Treatment

Julie L. Newman

Objective: To review the literature on the efficacy of duloxetine hydrochloride for the treatment of Fibromyalgia (FM) pain. Background: FM is a complex, debilitating, chronic pain syndrome affecting millions of people physically, mentally and socially. FM is characterized by muscle pain and stiffness, non-restorative sleep, and fatigue. Although the etiology is unknown, there is emerging evidence that the FM patient experiences pain amplification due to abnormal sensory processing in the central nervous system (CNS). Duloxetine is a potent serotonin and norepinephrine reuptake inhibitor approved by the FDA for the management of FM pain. Researchers have hypothesized that by inhibiting serotonin and norepinephrine reuptake in the CNS, one can interrupt the endogenous analgesic mechanisms via the descending inhibitory pain pathway. Method: The literature was searched for clinical trials in humans conducted in the past 10 years involving duloxetine for the management of FM pain. Results: Valid research studies included adult participants meeting the American College of Rheumatology 2010 criteria for clinical diagnosis of FM. The studies presented excluded participants with non-FM pain and those taking analgesics. Conclusions: Duloxetine (dose ≥ 60 mg/day) is an effective pharmacologic option for the management of FM pain. Overall, there was strong evidence for an association of duloxetine use with a reduction in pain, muscle stiffness, and sleep disturbances. However, there was no significant difference in fatigue. Common adverse drug reactions to duloxetine were mild to moderate in severity, and likely to include nausea, vomiting, headache and dry mouth.

97 Phase Plane Analysis

Andy Morgan, Chris Poullas, Elizabeth Rogenski

Our goal is to study autonomous systems of first order differential equations. Solutions to systems can be difficult to analyze so we construct the phase plane equation so we can actually visualize the behavior of solutions to the original system of differential equations. Using the phase plane equation we analyze critical points or equilibrium points and direction fields. We wrote a program in Matlab that graphs numerical solutions of the phase plane equation along with the directional fields. This gives us information about the behavior of the solutions of our original system at equilibrium points. In this talk we plan to analyze some interesting examples.

100 Grain Size Study of Beach Sands from San Salvador, Bahamas

Rachael Liposchak, Courtney McLaughlin, Brittany Stockmaster

Forty-two grab samples were taken from fourteen different beaches around the island of San Salvador in the Bahamas for a grain-size study. Samples were taken from the north, south, west, and east sides of the island to evaluate site-specific environmental conditions. Three samples were taken from each beach, respectively: one sample from the lower beach, one from the upper beach, and one from the dune environment. The samples were taken back to the lab for grain-size analysis using 2 mm, 1 mm, 500 μm , 250 μm , 125 μm , and 63 μm sieves. Preliminary analyses show that no generalities exist between beaches from east to west and north to south, suggesting other factors drive particle-size distributions locally. In order to fully understand how the offshore reef occurrence, wave exposure, and overall island configuration influence sediment-size distribution all fourteen beaches must be evaluated more statistically.

101 Development of Smart and Sustainable Apparel

Katina Darkadakis, Maya Bass

Smart clothing is a combination of wearable electronics along with textile science. Smart clothing is a "smart system" capable of sensing and communicating with environmental and the wearer's conditions. The responses that the smart clothing react to can be electrical, thermal, mechanical, chemical as well as in other forms. There is an extreme need for development of smart garments. These garments have the capabilities to assist with our daily struggles in addition have the benefits of enhancing daily life. Smart clothing is the future of apparel, as we know it however there are significant challenges such as wash ability, comfort, commercialization, cost, and power. These challenges pose a hindrance to the development of smart clothing. The purpose of our study is to develop and design a sustainable smart garment. The outcome of our study would be a garment that would benefit the community as a whole greatly.

104 A Safe Preparation of Azides and their Applications in Organic Synthesis Methodology

Jennifer Moore, Christopher Copeland

Azides lend both diversity and broad application to organic synthesis in that they are important intermediates for the production of organic and bio-organic products. Conventional use of sodium azide as an azide source poses risks as this reagent is potentially explosive when heated, making its large-scale industrial use dangerous. A facile alternative method of azide generation has been developed that safely employs sodium azide to produce aryl azide products that can then be subjected to more extreme reaction conditions. The utility of this azide source in click chemistry has proven successful in the copper-catalyzed cycloaddition of azides and alkynes to produce novel 1,2,3-triazoles whose applications lie in areas such as bioconjugation and the development of enzyme inhibitors. Additionally, aryl azides are useful in one-pot reactions that yield alkyl azides from alcohols and intermediates of this reaction have been characterized providing mechanistic proof. The one-pot nature of this synthesis is attractive for large-scale production. The azide nucleophile generated from aryl azides is ideal for SN2-type reactions

in which mechanism can be proven by stereochemical inversion. Work involving the application of aryl azides to the development of synthetic methodology will be discussed.

106 A Burning Question: Pour Pattern or Dropdown Fabric?

Melissa James

Fire science has grown exponentially in the past two decades, and the bulk of the research has focused on determining the origin and cause of a fire. A significant problem for investigators has been the misinterpretation of naturally-made fabric dropdown patterns as ignitable liquid 'pour patterns'. This study aimed to generate photos and spectrographic data on fabric dropdown patterns. Thirty common types of fabrics were purchased, hung over mattresses, and burned onto several different varieties of flooring surfaces. All burns were conducted within a vacant house on two separate controlled-burns. The resulting dropdown patterns were photographed and their residues were recovered for chemical analysis. Swatches of unburned fabrics were also recovered and analyzed with gas chromatography/ mass spectroscopy. Results showed that fabric dropdown patterns vary, but may be distinct to their fabric type. Further research should be done in an attempt to create a database of fabric dropdown patterns and their chemistry.

107 TRANSCRIPTIOAL ANALYSIS OF A POSSIBLE STRESS PROTEIN NCU-08832 IN NEUROSPORA CRASSA

Jared Senvisky

Neurospora crassa, like most fungi is very flexible metabolically. When a preferred carbon source, such as dextrose, is unavailable, *N. crassa* has the ability to metabolize non preferred carbon sources such as quinic acid. To do this, the quinic acid gene cluster is up-regulated by the qa-1F activator. Although the organism can survive, growth is suboptimal. Suboptimal growth is also observed in the presence of a poor nitrogen source. Earlier studies (Werry 2013, Tirabasi 2013) had shown that a previously unknown protein. (NCU08832) was induced in the presence of poor carbon and nitrogen sources. In this study wild-type *N. crassa* was grown on both preferred and non-preferred carbon and nitrogen sources. The mRNA from the tissue was extracted and quantitated. Primers were then made for NCU-08832 and reverse transcriptase PCR was run with the RNA from wildtype *N. crassa*. The products were then run on agarose gel, and placed under UV light to visualize the bands. Results reveal the presence of the transcript for the gene (NCU08832) when *N. crassa* was grown on either suboptimal carbon or nitrogen sources.

108 Increasing prompted and unprompted vocalization in teenage girls with autism using a progressive reading procedure

Katie DiCola

Some children with autism may have functional language and read on grade level or above but vocalize so softly and infrequently that their verbal behaviors are essentially nonfunctional, putting them at an immense disadvantage relative talking peers in all areas of life. Therefore methods to increase the frequency and strength of vocalizations are needed. In the present study a progressive reading procedure, similar to backward chaining, was used to increase vocalization in two teenage girls with autism. To begin, the instructor read the entire page and the student read the final word. Prompts were provided in a least to most hierarchy when necessary. Verbal praise was provided for all vocalizations, and tangible reinforcers for unprompted vocalizations. Reinforcement started on a FR1 schedule, and increased to VR3 after reaching the second criterion. Vocalizations increased dramatically and there was evidence that spontaneous vocalizations and functional speech increased outside of the experimental sessions.

109 Correlating between Pigeon Creek and Relict Tidal Systems on San Salvador Island, The Bahamas

James Frost, Robert Clark

San Salvador is presently covered with numerous hypersaline ponds, but only one active tidal creek: Pigeon Creek. Aerial images suggest many of the coastal ponds and ponds occupying inland interdune areas share a morphologic resemblance to the current tidal creek. Fresh Lake, Storr's Lake, and Salt Pond, are several water bodies located along the eastern part of the island that are very similar in morphology to Pigeon Creek. Studying core samples from these ponds and comparing them to sediments from the modern tidal creek allow a correlation to be made based on sediment texture and fossil evidence. Distinct layers of carbonate mud, sand, and shells are present in core at depth that differ from the modern organic pond deposits at the surface. Comparing this evidence to modern Pigeon Creek grab samples strongly suggests that Fresh Lake, Storr's Lake, and Salt Pond were once tidal creeks.

111 An Introduction to the Calculus of Timescales

Josiah Banks, Joseph Gantz, Austin Weinreber, Nicole Pavlansky

The Calculus of Time Scales, introduced by Stefan Hilger in 1988, seeks to unify the continuous analysis of differential equations with the discrete analysis of difference equations. We introduce Hilger's Delta Derivative on Time Scales, give a geometric interpretation of the derivative and definite integral on a Time Scale, and provide several examples including the computation of a derivative on the Cantor Set.

112 ZnO/metal layered 3D Photonic crystals

Michael McMaster

Three-dimensional (3D) photonic crystals are deposited by sputtering multilayer mesoscopic pillars of zinc oxide and a metal, either chromium or aluminum, in a triangular lattice. As a preliminary step, ZnO/metal one-dimensional photonic crystals are deposited with varying layer thicknesses. The layer thicknesses corresponding to the most prominent band gap are chosen for the layered pillars of the 3D crystal structure. The photonic crystals are tailored to ensure that the optical band gap lies within the spectrum of visible light for near normal incidence. The band gap of the 3D photonic crystal is measured by collecting the absorption spectrum.

115 Bringing the War Home: Redeployment Experiences of Spouses of Combat Veterans with Post-Traumatic Stress Disorder

Ashley Rossi

The purpose of this study is to better understand, through retrospection, how military spouses recognized the likelihood that their veteran needed to be evaluated for Post-Traumatic Stress Disorder. Existing research examines the role educating spouses of veterans with PTSD can play in the detection and diagnosis of PTSD but it does not identify specific educational needs of spouses. An online-survey was administered to spouses of combat veterans with PTSD. Themes between respondents were identified as need for self-care, avoiding self-blame, and tolerance and understanding for the veteran. Participants discussed lack of education on PTSD and redeployment issues as well as perceived lack of support by the military during deployment and redeployment processes.

116 Party On The Wall

Mathew Biedka, Dustin Bowman, Kenneth Burton

Party On The Wall is a school spirited LED display that incorporates incoming audio with a superb light show. The goal of our project is to simplify the setup of lighting displays for anyone from the average DJ, to the crew for a sold out concert at Star Lake Pavilion. Our design utilizes the technology of an I.C. chip to separate the audible audio frequencies into seven band pass filters. Each band pass filter outputs to a

strip of LED's through a microcontroller when the corresponding frequency is played. Come join us as Party On The Wall excites your senses with technology and your favorite tunes.

117 Weight Change and High Academic Stress during College Years

Melissa Pintar, Dana Onesti, Deann Sovak, Zachary Morrison

There is ample evidence that stress changes the hormonal environment in the body, which in turn can trigger changes in the brain and neurotransmitter production. This can result in changes in eating behaviors. This study relates to emotional eating associated with academic pressures in the college setting. Emotional eating during periods of high stress prior to projects, deadlines, and exams may be frequent enough throughout the college years to significantly affect students' eating patterns. The study will explore the prevalence of emotional eating related to stress during defined periods of high academic stress, and weight change in college students. Data was collected using a seventeen-item survey. The survey was administered to three general education classes and one higher level course yield a varied population. Data will be collected and analyzed from about 100 surveys. Students were asked to report the frequency of eating behavior changes, as well as changes in weight during the college years resulting from altered dietary habits. It was anticipated that students tended to eat more in a week prior to exams, that females were more likely to consume high fat foods and simple carbohydrates, that males were more likely to select high protein choices, and that students would report an overall 5% weight gain within the first three years of college.

122 Design and Analysis of a Wind Turbine Transmission

Matt Harrold, Sam Herb, Rick Heusey, Mike Krizner

Renewable energy is a going field of interest in today's global environment. Devices to capture energy from renewable sources are becoming an important design focus. The present study addresses the mechanical power transmission and electrical power generation requirements for a small vertical wind turbine. A multi-stage planetary gear transmission was designed to convert a power input from a shaft at 100 RPM and a specified torque to an output power at 1800 RPM. An electrical generator was chosen to convert this shaft power output to approximately 10 kW of electric power. Mechanical analysis was performed on the transmission stage of the design. This analysis consisted of dynamic and mechanical stress approaches. The dynamic approach was used to determine the necessary gearbox components to convert the input rotational velocity generated by the airfoils into the required input rotational velocity for a generator (1800 RPM). The mechanical stress approach was then used to ensure the gears could withstand the transmitted loads. The analysis predicted the design required to withstand the forces applied while providing adequate service life.

125 Time and Labor Efficiency Study at Northern States Metal

Keyvan Mehri, Chris Elkins, Mason Giacomelli

Industrial engineering student-analysts studied a process at Northern States Metal, a leading provider of custom extrusions and quality parts located in Youngstown, Ohio. Processes include fabricating, extruding, designing, and finishing metal parts. As a requirement of the Methods Engineering course the analysts applied multiple techniques in the study of labor efficiency as documented in this QUEST presentation. Instances of improvement were derived by the team of analysts through the observation of several trials in addition to researching the current industrial process. By utilizing methods engineering skills the team successfully quantified the time study and labor analysis. Opportunities for making throughput improvements were considered and a high-impact proposal was provided to NSM for their consideration.

127 Low Velocity Impact of Fiber-Metal Laminate Structures

Zach Abraham, Dalton Westhead, Dominic Sikora, Steven Schifffhauer, Casshan Wallace

Research project of the low velocity impact properties of fiber-metal laminate structures (FML's) consisting of an aluminum alloy and shape memory composite. The FML's were supported in a frame and subjected to a wide range of impact loads to determine the potential energy required to fracture the material. It was observed that the deformation of the individual components was much more extensive than the small deformation in the FML. The analytical model was used for predicting fracture properties of the FML's.

129 Genetic testing: Does a woman choose to know or not to know her risk for breast cancer

Nicole Noday

There is an increasing awareness for women to be informed of their risks for breast cancer. Women who have first-degree relatives that have been diagnosed with breast cancer are now offered the choice to obtain genetic testing. This is a personal choice that presents many different reasons to discover if an individual carries the BRCA gene mutation. This study identifies the choice to receive or not to receive genetic testing and reasons for their decision. This study takes place at a mid-western university campus. The participants were randomly selected to complete a questionnaire. The questionnaire collected demographic data and individual responses about their choice to receive genetic testing for the BRCA gene mutation, if they had a family relative that was diagnosed with breast cancer. This qualitative study collected narrative reasons to further provide an understanding of an individual's choice. Participants were provided informational brochures on breast cancer. Limitations and recommendations will be presented.

131 Same-Sex Marriage and the Rule of Law

Melissa Wasser

2013 was a year of milestones for same-sex marriage. Over the past year alone, the United States has had seven states and the District of Columbia legalize same-sex marriage, making seventeen states where same-sex marriage is legal. As the United States is a society that adheres to the rule of law, it must protect all fundamental rights, including marriage. With two recent same-sex marriage decisions by the United States Supreme Court, some argue that there is a shift towards acceptance of same-sex marriage. With this growing acceptance, this paper argues that the rule of law necessitates the acceptance of same-sex marriage throughout the United States. I will begin by exploring the history of marriage and how it has changed over time. I will then show how the United States achieves the rule of law through our political process and that same-sex marriage should be protected as a fundamental right. I will address some common objections to same-sex marriage and address the timeline of major legal decisions, both at the state and federal level. In addressing this issue, it will also be necessary to consider some other issues that arise in the philosophy of law, specifically, how the rule of law can work in a constitutional republic (i.e. the United States), the debate between the natural law and legal positivism views of the law, and how same-sex marriage fits into these views.

132 The Booker Project

John Veauthier, Sara Rodino, Karen Bell, Justin Passaro, Wanda Baker, Catilin Worley, John Veauthier

Students of color who attended Youngstown College from the 1930s through the 1950s inspired The Booker Project. During that time, African American students and others of color were denied "Activity Cards" which gave students access to and college-sponsored events. Simone Booker, a son of Youngstown, left the campus after being denied this activity card. Booker returned to be the commencement speaker for the fall class of 2013. A group of Dr. Lenhoff's Composition one students traveled to Washington D.C. where they interviewed Mr. Booker, the first African-American journalist hired by the Washington Post. The students then interviewed former African-American students who attended YSU; created a 30-minute radio program; produced a short documentary; published a book; produced a

website. We would like to show the finished products and discuss what we learned to demonstrate the unbelievable capabilities of an introductory class.

134 Impact of Strength on Quality of Life and Physical Performance in Ambulatory Patients on Dialysis

Ryan Guy, Cherry Valino, Jill Jonda, Caitlin Glenn, Crystal Alexander

Purpose: The purpose of this study is to describe how strength may influence physical performance and quality of life for individuals with End Stage Renal Disease(ESRD) who are receiving dialysis. **Methods:** Twenty-two ambulatory adults with ESRD participated. Subjects were tested for grip strength(Jamar) and lower extremity(LE) strength using a MicroFet2 hand held dynamometer(HHD) in standard positions. Quality of life(QoL) surveys included; Medical Outcome Survey-Short Form 36(MOS-SF-36); Activities Balance Confidence Scale(ABC Scale) and Physical Activity Scale for the Elderly(PASE). Physical performance measures included; Timed Up and Go(TUG) estimated 6 Minute Walk Distance[6MWDEST] and a Short Physical Performance Battery (SPPB)[4 meter gait speed, 5x Sit-To-Stand (5x STS) and Romberg score] **Analysis:** Descriptive and correlation analyses were performed. SPPS(17.0) with level of significance set at $p < .05$. **Results:** 17 males and 5 females with mean age=57.23(12.20) and body mass index (BMI)=27.49(5.81) participated. LE strength was 40-85% predicted. Mean quality of life scores were; ABC = 75.23 (23.71), PASE=320.86(44.89) and MOS-SF-36 = 49.19(10.83). The mean (SD) physical performance values were; Gait speed 1.09 meters/second(.40), 6 MWDEST 403.3 meters(131.3), TUG 10.53 seconds(3.13), SPPB 9.0(2.2). QoL surveys were moderately associated to R and L grip strength (SF 36 PC $r = .56$ and $.54$; ABC($r = .72$ and $.65$), STS(ABC $r = -.47$) and dominant knee extensor strength raw and adjust for body weight(SF 36 PC $r = .45$ and $.54$; ABC $r = .74$ and $.53$). There were moderate association between LE power(STS) and all measures of physical performance. Grip was associated with TUG and 6MWD but not SPPB. After adjusting for body weight ankle strength had moderate associations with gait speed and TUG while knee flexion strength related to 6MWDEST. **Discussion:** Mean values for gait speed, 6 MWDEST, TUG indicated that subjects were functioning in the community they walked slower than predicted with an increased fall risk and lower quality of life. Future research could explore interventions to improve strength in muscles significantly related to physical performance.

137 SmartPark

David Berry, Yonatan Tadesse, Sean Lynch

With over 14,000 students at Youngstown State University, over 90% of the student body commutes to campus. With the limited number of parking options, many students are frustrated each morning with finding available spots. The SmartPark team wants to design a system that implements a smarter parking experience for the students and visitors at Youngstown State University. By utilizing sensors and a specialized counting system, students will get to class faster and have an easier time parking.

139 An Analysis of How Individuals Make Judgments of a Person's Sexual Orientation Based on Physical Appearance.

Christina Marie Yovick

Research has shown that people are able to accurately judge a person's sexual orientation by simply looking at an individual. Through my research, I examine the differences between male and female college students and how they make assumptions about straight, lesbian, gay, bisexual, and transgender individuals based solely on physical appearance. I am using survey data taken from a sample of 173 men and women on the campus of Youngstown State University. Survey respondents were given sixty seconds to judge ten individuals. Respondents judged each individual's biological sex, sexual orientation and transgender identity, then reported what physical attributes they used to determine their responses. While my research shows that respondents were able to accurately assess a person's biological sex, sexual orientation and/or transgender identity, there is a statistically significant difference between the accuracy of men contrasted with the accuracy of women. My current ongoing research shows variances

between men and women among different college rank, age group, and level of interaction with LGBT identifying individuals. Further analyses will determine which physical attributes played a role in the snap judgments of the survey respondents. These analyses may uncover how cultural stereotypes are made and reinforced. These findings can also be used by YSU students to raise awareness of stereotyping and promote multicultural diversity on campus.

140 The use of arylsulfonyl azides as precursors to organic derivatives

Kwaku Kyei-Baffour, Mike Delost

Arylsulfonyl azides are a safe alternative to making alkyl & acyl azides, as opposed to sodium azide which produces hydrazoic acid. Alkyl and acyl azides are very versatile organic compounds, especially in the fields of Biochemistry, and Medicinal Chemistry. In this lab, arylsulfonyl azides, such as 4-nitrobenzene sulfonyl azide (p-NBSA) are used as azide sources for the synthesis of alkyl and acyl azides. In our lab, acyl chlorides have been treated with p-NBSA in the presence of DBU, a base, to produce acyl azides. In addition, primary alcohols treated with p-NBSA in the presence of n-butyl lithium, a base, produce alkyl azides. Once these azides are formed, organic derivatives such as carbamates, ylides, imines, amides, and amines can be produced. Curtius rearrangements and Aza-Wittig (Staudinger) reactions have been utilized to synthesize carbamates and ylides respectively.

143 Design and Analysis of a Power Drill

Mike Bestic, Cody Gillespie, Adam Graff, Tim Shreeve

In the construction and fabrication industries power drills play a critical role. More efficient and powerful drills allow for more complex designs. The purpose of this research was to analyze basic components within a cordless power drill and modify individual parts to incorporate a 24 volt electric motor. The internal components of the power drill include a basic planetary gear system and a clutch system to control the torque passed to the bit. The analysis consists of kinematic and stress approaches. The kinematic approach involves the fundamental study of gear and velocity ratios, and applies to the planetary gear set. This approach attained the required gear diameters and number of teeth. The stress approach is based on the Tresca Maximum Shear Stress Theory, and the Von Mises Maximum Distortion of Energy Theory. The stress approach was applied to require gear diameters to determine the material and thickness of the gear. Initially the material was chosen to be 1045 steel, as this is a very common material used in this application. This will reveal whether the current housing needs a modification to permit the addition of the newly sized gear. The analysis will determine if the incorporation of a 24 volt motor is permissible.

144 Preventing Crime with the Criminal Mind: A study of how the techniques and strategies of criminals can aid in crime prevention.

Christopher Adkins

Throughout history, criminologists have proposed theories about what causes crime and what can be done to prevent it. The purpose of this paper is to examine what information can be gleaned from the criminal mind to prevent certain types of property crime. Prior research has examined the candid interview responses of convicted and active criminals in each of their own areas of criminal activity. This research evaluates the interviews of those that commit burglary, automobile theft, robbery, and other property crimes, as a whole, to use their modus operandi as a source of crime prevention information. This research will show that the majority of convicted and active criminals act upon rational choices. It will also show that the information obtained from these criminals will better aid criminal investigation, rather than prevention, and the application of proactive techniques will be more successful for the intended victim, than they are for policing strategies.

147 Cognitive Dissonance Theory: Homosexuality and Religiosity

Sarah Mercer, Rachel Coggins, Deonte Tarver

Though attitudes toward gay rights are changing, conflict between the religious and gay communities remains problematic. This study sought to discover the experience of homosexuals who identify as religious or who have a religious background.

Cognitive dissonance theory states that people work to reduce discomfort experienced by conflicting thoughts, attitudes, or behaviors. This study specifically aimed to identify some of the strategies used by religious homosexuals and homosexuals with a religious background to decrease discomfort from these two often conflicting identities. In addition, specific attention is paid to the differences among gay men and lesbians in handling this conflict.

Members of YSUnity and the Unitarian Universalist Church of Youngstown were surveyed along with other volunteers from the Youngstown area. The research revealed that a significant amount of internal conflict was experienced by most participants. In most cases, this led to a negative self-image and a change in attitude toward religion.

148 The Effects of Fluoride in Drinking Water on Sleep and Cognition.

Aaron Mrvelj

Fluoride is a known neurotoxin that accumulates in the pineal gland, the brain structure responsible for regulating sleep via the hormone melatonin. Despite fluoride's effects on pineal protein and enzyme activity and its association with reductions in IQ the United States Environmental Protection Agency (EPA) allows up to 4.0ppm in drinking water (EPA.gov). The current study examined sleep patterns and cognition in rats before and after experiencing either one of five fluoride doses, tap, or fluoride free drinking water daily for four weeks. We found that animals given fluoride spent more time sleeping than the fluoride free group, but less time sleeping than the tap water group. There was also a decrease in cognition after animals experienced the highest doses of fluoride compared to lower doses. These results confirm that fluoride in drinking water has negative effects, and fluoride's combination with other contaminants of tap water may exacerbate these effects.

149 Water Quality and Macroinvertebrate Assessment of a Channelized Stream: Snyder Ditch in Orwell, Ohio on the Western Reserve Land Conservancy

Emily Ankney

Water is our most scarce resource, and human impact is a big concern when it comes to stream quality. Channelization, straightening of streams to better fit our land use needs, is one way humans severely impact stream quality. Channelization of streams can be helpful when new construction projects occur and also for agricultural purposes; however, channelization causes stress for the aquatic life. A 4 km (2.5 mile) portion of Snyder Ditch is channelized, mostly for agricultural purposes. The purpose of this study was to determine the stream quality of this channelized stream utilizing macroinvertebrate diversity studies and habitat and chemical water quality data. The hypothesis was that the stream quality would not reach warmwater habitat quality. An additional goal of the research is to suggest to the land-owners the best strategies in order to restore the land. There were three sampling dates: May, August and October where habitat, chemical parameters and macroinvertebrates were measured and compared against Ohio Environmental Protection Agency's stream use designation of warmwater habitat. The results far surpassed the expectation of the stream; however, still did not reach warmwater habitat designation criteria. This is the first of many studies that is needed in order to determine the correct course of action.

151 Locational Disparities of Mental Health Courts

Elizabeth Hornberger

The population of incarcerated individuals in the United States is littered with those suffering from mental illnesses. In the 1980s, when this problem was first recognized, the criminal justice system initiated mental health courts. Modeled after drugs courts, their successful predecessors, mental health courts

focus on diverting mentally ill criminals and defendants to programs and services designed to improve their behavior. Significant advancements have taken place since the creation of these courts, but there is still room for improvement. A major disparity can be attributed to the court's locale, specifically, the lack of mental health courts located in rural settings. The history and development of the mental health diversion process is explored in the following section. A more detailed look regarding court location is then scrutinized, including an in-depth examination of a single, successful mental health court model found in a rural setting.

152 Dissociating Implicit and Explicit Learning Systems Over Development

Michelle O'Connor

The purpose of the proposed project is to investigate the developmental course of implicit learning by considering its interaction with explicit learning skills. Implicit learning is subconscious learning that takes place without conscious effort or awareness and occurs across all ages. Explicit learning is an active effort to acquire information and varies across ages as the prefrontal cortex matures in development. There is current debate whether these two learning systems are independent of each or frequently interact in such a way that information learned through one system may transfer over to the other system. With our current project, we seek to provide an unbiased test that establishes that implicit learning does not vary across development. This is known as the age invariance hypothesis. Second, we seek to test whether there are developmental differences in the ability to transfer between the two modes of learning, and whether these differences are caused by a complete lack of transfer between the systems, or are due to a general deficit in explicit processes in children. The method will be to vary implicit and explicit learning demands across training and test conditions in an artificial grammar learning task (AGL) in first (6-7 years) and fourth grade (9-10 years) children. The significance of answering these issues will be to develop a procedure that taps pure implicit learning so that questions of the invariability of implicit learning may be resolved.

153 Characterizing High-Strain Rate Behavior of Stainless Steel Fabricated by Additive Manufacturing

Ashley Bowers

The world relies heavily on conventional manufacturing processes focused on mass manufacturing. However with the recent initiatives and advances in additive manufacturing, several are rethinking their strategies. Additive manufacturing allows one to develop products with great complexity and customization, two things conventional practices cannot achieve. In order to adopt additive manufacturing, properties data must be obtained for potential applications. There is little data available on the impact resistance of structures fabricated using additive manufacturing. Relevant applications would include armor (both personnel and vehicular), gas turbine engine components requiring foreign object damage resistance, and vehicular crashworthy components. The research proposed would utilize additive manufacturing by fabricating stainless steel using a Selective Laser Melting system provided by America Makes/NAMII. Once the stainless steel is produced, the strength of the additive manufactured stainless steel will be compared to the strength of the wrought stainless steel using a gas gun. The gas gun, which is capable of shooting up to 1000 m/s, will shoot two specific projectiles including a hard and a soft material. During the testing phase, the projectiles will be shot at increasing velocities until complete penetrations on the stainless steels are achieved. Once the research is completed and the results are obtained a photographic examination will be conducted to determine the specific impact on each steel. Additive manufacturing is a rising topic in today's manufacturing world; therefore the results of this research will be utilized in determining the maximum strengths.

154 Finding Patterns and Strategies in Developers' Eye Gazes on Source Code

Leela Krishna Yenigalla, Sruthi Bandarupalli

We present observations on patterns and strategies expert developers use while reading source code. An interpretation of two code segments of two expert developers is given in the context of a coding scheme.

The video sessions are qualitatively assessed in a somewhat structured manner based on the coding scheme given. Results indicate that the method of reading source code varies based on the task however some similarities are noted. Implications of these results to Computer Science education are presented.

156 Gender Based Crime Study: The Comparisons and Differences between Regions and Crime Rates in Ohio

Kristin Helle

This thesis will test the extent to which deviant place theory can be used to explain differences between principal city (metropolitan and micropolitan), suburban (metropolitan and micropolitan), and non-metropolitan places. Deviant place theory is also used to explain differences in gender-based crime rates. Using crime data from the 2010 National Incident-Based Reporting System, this thesis, using ordinary least-squares regression, attempts to create a gender based crime and victimization analysis. This study specifically focuses on comparing principal city, suburban, and non-metropolitan geographical areas where crimes take place within Ohio. It is expected that principal city and suburban statistics will be the most similar given previous research findings. Non-metropolitan regions should carry different statistical finding compared to principal city and suburban. It is also expected that there will be significant differences between male and female crime and victim statistics between the five geographic regions studied.

163 Lower Dissent and Facilitate Unity in Religious Organizations: Introducing a Willingness Theory

G. G. Basham

Lower Dissent and Facilitate Unity in Religious Organizations: Introducing a Willingness Theory

This is an analysis of academic literature that researched the issue of dissent with a focus specifically on religious organizations. As a result of the analysis there were three findings. First, religious leaders and non-religious leaders have different perspectives about why dissent happens. Second, religious leaders and non-religious leaders have different perspectives about the triggers of dissent. Third, seven principles emerged from the analysis that appear to decrease dissent and facilitate unity within religious organizations. These principles involve the religious leader willingly initiating, with others in the religious organization, building and maintaining relationships, using effective metaphors and language, spending time in prayer together, taking time to listen, participating on the same project/mission, providing and receiving validation, and focusing on similarities. These seven principles have implications that lead to lower dissent and facilitate unity within religious organizations are referred to as Willingness Theory.

164 Thermoelectric Generators Utilizing Excess Heat from Pellet Stoves

Matthew Conner, Chris Bowin, Caitlyn Rodomsky, Lauren Rodomsky

Pellet stoves are used to burn compressed wood or biomass pellets to create heat for industrial or residential applications. Pellet stoves run on electricity and need to be plugged into the power grid. Therefore pellet stoves are particularly susceptible to power outages. The excess exhaust heat can be utilized using thermoelectric generators (TEGs). TEGs use a temperature difference and heat exchangers to generate electricity. This design intends to investigate the use of TEGs attached to the exhaust of the pellet stove. Several commercially available pellet stoves and TEGs were analyzed and selected to best suit this application. The stoves were analyzed for heat content and heat exchangers were designed using SolidWorks and Flow Simulation. Ideally the TEGs will generate enough power to run the devices in the pellet stove, thereby removing the pellet stove from the power grid.

165 Adding Fuel to the Fire: The Absorption of Medical Oxygen in the Home

Melissa James

Fires in the homes of individuals who are using medical oxygen are becoming a common phenomenon in the United States. Although fire investigators and medical personnel are aware that it is dangerous to have an open flame near an oxygen source, they have failed to consider the saturation of oxygen into the

surrounding clothing, furniture, and bedding. Very little research has been performed on oxygenated fabrics and open flame.

The most recent study focused on fires in the homes of people who are using home medical oxygen. A recent vacant house fire experiment demonstrated that a fabric pillowcase exposed to an oxygen source burned completely, and more quickly, than an identical pillowcase from a typical household. Interestingly, the pillowcase that was in the oxygenated environment was removed from the oxygen source the evening prior to the control burn (over 12 hours). This finding generated the need for further research in this area. The plan for continued research is to compare ignition and burn rates of fabrics that are saturated with oxygen, versus the same fabrics that have not been exposed to an oxygenated environment. Duplicate clothing and upholstered furniture will be purchased; one outfit and chair will be stored with an individual that is using medical oxygen, and the other set will be kept in an un-oxygenated home for a finite period of time. Two fiberglass mannequins will be placed into a vacant room side-by-side, outfitted with clothing, and placed into the upholstered chairs in a realistic sitting position. Both mannequins will be simultaneously subjected to a tipped over candle. Fire personnel will recover digital video, and the event will also be timed from the flame point until the fabric self-extinguishes. Results will be submitted to the International Association of Arson Investigators (IAAI) and to a prominent medical journal for potential publication.

167 The Completeness of the Emergency Medical Record with the Implementation of Speech Recognition Technology

Daniel Cesene

The advent of the Electronic Medical Record has transformed the process of medical record keeping. Combined with the implementation of Speech Recognition Technology, the capabilities for computerized clinical documentation have revolutionized. Medical technology always has the responsibility of providing advancement to science while insuring benevolence to humanity, therefore; the utilization of speech recognition within the patient record must be proven to remain safe, reliable, and proficient. This research presents an overview of the context of this study in terms of the issues it addresses, the importance of the research conducted, and the specific problems to be examined.

169 Coffelt Hall Rain Garden

Andre A. Silvers, Pat Circelli

Recent developments in construction include “green” and “sustainable” storm water management practices. The Youngstown State University “Gateway Project”, completed several years ago, consists of several sustainable items including bioswales and a rain garden which are designed to filter out impurities in storm water run-off and allow water to recharge the surrounding water table. The bioswales are located in the parking lot of Coffelt Hall on the north side of campus and are thriving and performing remarkably. However, the rain garden located adjacent to the bioswales has ceased to support any plant life. The purpose of this research is to determine the exact cause of the rain garden malfunction and to develop a plan to revitalize the site. This initiative will identify key properties of the soil including porosity/permeability and pH which play crucial roles in supporting a healthy rain garden. By identifying the rain garden’s soil properties, a plan can be established to bring plant life back to the rain garden ensuring sustainable storm water management.

171 Job Satisfaction and Organizational Commitment-C's Waffles

Michael W. Mace, Alexander Chang, Nicholas Mikula, Cara Ricottilli, Michael Valiski

Purpose - The study to follow will focus and address the relationship between job satisfaction and organizational commitment. As a group, we wish to specifically examine the possibility that job satisfaction can predict or enhance organizational commitment.

Design – This paper is based on a field study performed at a local chain restaurant. Over 90% of those currently employed participated in the survey.

Findings – Job satisfaction is found to be related to organizational commitment. This general finding is limited by the current hours of operations, the number of employees currently employed, and the shift worked.

Practical Implications – The study performed at C’s Waffles expresses the crucial aspect of recruiting and retaining employees who value the organization. In parallel, the organization must reciprocate by providing valuable job characteristics, including but not limited to: meaningful tasks; effective supervisors; agreeable pay; promotion opportunities; coworker relationships; and simply enjoyment of the work itself.

Value – This paper is useful on its own as an instrument providing research experience and additionally helping us to conceptualize what we have discovered through classroom instruction, discussion, activities and readings with a real-world analysis.

172 Constructing an Education Tool and a Scientific Machine

Christopher Karlic

Science education to the general public is a critical but under-appreciated activity in today’s society. This project was designed to construct an educational piece of scientific equipment which could entertain people of all ages. This project was to design, construct, and fabricate from basic materials, a Rube Goldberg Machine. This will be placed outside of the Ward Beecher Planetarium in Ward Beecher Hall, and will serve as a science education tool. This project aims to attract the public’s eye to the fun of science, and to introduce the world in which we live in. When this project is completed, it will showcase the most basic principles of physics within the mechanisms that allow this apparatus to function. Children, teenagers, and adults will all be able to witness classical mechanics, the law of conservation of energy, the law of conservation of momentum, Newton’s Laws, harmonic motion, circuits, and optics. One part of this machine will be constructed using one of the Rayen School of Engineering 3-D printers available for faculty and student use. Not only will this project apply old science theories and laws, but the parts will be of new material; bringing the old and new together.

174 Perceptions of the Undergraduate: A Qualitative Study on Aural Skills

Meredith Anderson

Undergraduate students do not always see the value of a proper education in music theory and aural skills. Students are often more focused on ensemble and applied performance than academic classes, and may ultimately be unprepared for their chosen career path. Many students studying music education are not fully equipped to use music theory and aural skills in their K-12 classrooms post-graduation. Students with dreams of becoming a performer typically do not value academic skills over technical performance skills. In this study, I hope to discover how undergraduate students of varying majors, instruments, levels, and disciplines value their ear training. I also hope to explore how they process what they hear on ear training examinations through examples followed by open discussion of thought process.

As a lightning talk, this presentation will be heavily based in recorded interviews. It is important not just to hear what students have to say, but how they say it. I will be interviewing students from different ear training classes and observing how these ideas may evolve in students of similar majors and career goals. During the presentation, I will also provide examples of the ear training exercises and the student response at varying levels. The short, concise format of the presentation will assist me in providing a quick perspective for both faculty members and students attending the talks.

176 Bluetooth Low Energy Clicker Application

Drew Duraney, Thomas Bakalar, Janette Cross

We are developing a polling response clicker module for Turning Technologies. This will utilize Bluetooth Low Energy (BLE) technology and popular smartphone devices with an installed application. In order to do so, we are bridging the communication gap between the phone and the current receivers used by Turning Technologies. To accomplish this, we developed C-code that would transmit data to an intermediate device via BLE, which in turn will send this data to the receiver. Also, C-code was developed

that will transmit data from the receiver to the smart phone via the bridge device. This will allow question and submission confirmation to be sent directly to the smartphone via application.

178 Evolution of the Current Power Grid

Ruth Lin, Jonathan Duran, Cassie George, Daniel Eich, Jacob Stracola

This presentation is about the electric power grid. The presentation will focus on the evolution of the power grid, the present day physical topology of the power grid, the importance of the power grid in maintaining our standard of living, as well as current challenges and solutions in maintaining a functioning power grid. The presentation will also touch on possible future challenges and solutions as a lead-in to following group presentations; our presentation is a sub-presentation of a larger presentation (on the power grid) being put together by the junior Electrical Engineering class.

185 Lake Levels and Hard Structure Orientation Controls on Headland Beach Evolution Along Ohio's Lake Erie Shore

Joshua Fowler

Headlands Beach and Walnut Beach, located along Ohio's sediment-starved and heavily armored shoreline, have exhibited net progradation since installment of harbor-protecting jetties in the early 1900s. The interruption of littoral transport by these hard structures has dictated the bounds of adjacent beach form. Sediment flux to the littoral system is heavily impacted by lake levels; higher lake levels supply the nearshore with more bluff-derived sediments, whereas lower lake levels limit sediment supply. Ground-penetrating radar (GPR) was collected along dip-oriented transects across beaches to resolve progradational patterns in the subsurface. Changes in lake-level position, sediment input and accommodation space are captured in the depositional record as variances in clinoform geometry. Lake level acts as an extrinsic control on clinoform preservation. Periods of high lake level preserve the topset geometry of earlier deposition. In the 1960s an accommodation threshold was reached impacting beach evolution patterns due to a shift in structure orientation.

195 Mechanics of a Single Cable Elevator

Lucas Obrenski, Jon Muszik, Mike Livi, Karlie Ligore

The single cable elevator is the most common elevator designs in use. It is safe in its operation, and simple in construction, being appropriate for residential, commercial, and industrial applications. The elevator specifications depend on the load the elevator will be expected to lift. For a commercial elevator, the typical rated load one ton. A counterweight will be used to decrease the strain on the elevator's drive motor. The counterweight will be suspended opposite the car from the same cable. The calculations that will be done deal with: finding the diameter of the cable, stress analysis of the drive sheave, appropriately sizing the drive shaft, finding an appropriate drive motor torque rating, and a consideration of possible safety mechanisms for inclusion in the design.

The design approach will consist mainly of static stress analysis, as the design factors included in the elevator code take dynamic loading and fatigue strength into consideration. ASME elevator code will be followed wherever applicable.

198 Eliminating the Corrosive Effects of One Student's Behavior with an Independent Group Contingency

Samantha Evans

The rates of classroom wide disruptive behavior of a 4th grade classroom were highly correlated with the presence or absence of one student. Rather than target the particular student's disruptive, corrosive

behavior, an independent group contingency -in the form of a punch card token economy- was implemented for the entire classroom. Rates of disruptive behavior were virtually eliminated regardless of the presence or absence of the student, whose attendance previously co-varied with high and low rates of disruptive behavior.

199 Hard-Wood Lathe: Incorporation of Cog Belt & Tapered Bearing

Kevin Socha, Eric Myers, Nathaniel Marchese, Stephen Zaborsky

Lathes are one of the most common production machines due to their ability to create unique combinations of cylindrical and spherical attributes about an axis. They are used to manufacture spindles, table legs, baseball bats, etc. This work will attempt to address common issues that are currently present in lathe designs. The first issue investigated was the bearing life of the typical double shielded steel ball bearing. To address this issue, tapered bearings were introduced to increase the bearing life. The second issue deals with the traditional gear driven system that is equipped with most wood lathes. The debut of a cog belt drive and cog gear for the input from an electric motor was selected to solve this issue. As a third issue of a standard wood lathe design, historically malfunctions for the drive mechanisms resulted in replacements of entire parts. The addition of keyhole mounts for the cog gear and the shaft were designed to solve this issue. The dynamic approach was first used to determine angular velocity. Subsequently, this was then used to determine torques and tangential forces based on static theory. The force of the pulley and the maximum tangential force were determined through a dynamic theory approach. The stress approach used to investigate the supplementary productive lathe design used the results found with the dynamic approach and is what is used to determine materials used for design, number of teeth for the pulleys and belt thickness used for the drive belt. The final design proposed here allows for a more productive lathe because it will experience less downtime and require less process adjustments than current designs.

201 Thermoelectric Generation for Pellet Stove Applications

Michael Savopoulos, Zachary Bromley, Samuel Faykus, James Schuster

The product concept proposed is a thermoelectric generation (TEG) system that will produce electrical power to operate a pellet stove. This system is intended to provide power for owners of pellet stoves who are in remote locations and rely on pellet stoves for heat, even during power outages. These consumers number 1.2 million with an additional 80,000 new consumers per year. The system was designed to incorporate commercially available TEGs, paired with a lithium-ion battery and proprietary heat exchanger into an after-market add-on that is compatible with a multitude of pellet stoves. The Li-ion battery pack was selected to provide enough electrical power to cold-start a pellet stove and allow the exhaust heat to reach the desired operating temperature (200 °C). The heat exchanger was design and evaluated using SolidWorks Flow Simulation to analyze the fluid-thermal performance. Various heat exchanger designs, evaluated in terms of their ability to remove sufficient heat from the exhaust stream and ability to apply the appropriate temperature difference across the TEG, will be discussed.

203 Use of Thermoelectric Generators on Pellet Stove Exhaust

Matt Shar, Justin Misiura, Ryan Ward, Casey Keller

The current backup energy source for pellet stoves is inconvenient for power outages as well as for stoves that need to be used off the electrical grid. As an alternative power source, thermoelectric generators (TEGs) were researched to be integrated onto the exhaust pipe of the pellet stove such that it could power the necessary electrical components on the stove to keep it in operation independent of other electrical sources. The TEG must be compatible with current, existing pellet stoves and must be relatively simple to install. The designed system must generate 120 – 180 W and extract a minimum of 3,600 W from the exhaust gas. Design constraints included TEG efficiency, available heat content with the exhaust gas, heat exchanger surface area, and exhaust flow rates for different fuel burn rates. Various heat exchanger designs were evaluated using SolidWorks Flow Simulation to determine the

effectiveness of each design to extract adequate amounts of heat. Aspects of the design and design process will be discussed.

205 Dynamic Equations on Time Scales

Kevin McLane

Time scales unify the theories of difference equations (discrete) and differential equations (continuous). A time scale is any closed subset of the real line. The generalization allows for the study of dynamical systems that have both discrete and continuous parts. This study will investigate linear dynamic equations and the cantor set as a time scale.

206 Computational Analysis of Gas-Phase Fragmentation

Jennifer Williamson

The gas-phase ligand exchange between several cobalt and zinc beta-diketonate complex molecules was recently reported in the literature. In an attempt to better understand these experimental results, a computational method was developed using Spartan to analyze the energetics of possible transition states associated with the observed mass spectrometric fragmentation. Gibbs free energy and heats of formation calculations were determined at multiple bond lengths where the calculated single point energies were found to be consistent with the observed experimental results.

209 Interaction of Metal Catalysts with Different Morphological CeO₂ Supports for CO Oxidation

Samantha Mock, Megan Rochow

Surface facet orientation of CeO₂ nanoparticle plays a critical role on oxygen vacancy formation/elimination under reducing/oxidizing conditions, which is directly related to its oxygen storage capacity (OSC) and catalytic activity in metal-CeO₂ catalysts. We report a detailed kinetic behavior study of metal-CeO₂ with well-defined CeO₂ surface planes on CO oxidation. Shape/size-controlled CeO₂ nanocrystals with reactive {110} and {100} faces were prepared by facile hydrothermal reactions. The catalytic activity of CeO₂ supported metals is believed depending on the number of perimeter metal atoms and the metal-CeO₂ interaction at the interface. In this study, we compare the catalytic activity of materials by using different metals (Pt, Au, Ni, Cu etc.) on a same shape CeO₂ nanocrystals support and by varying size and amount of metal clusters on CeO₂ support to understand the interfacial perimeter effect. This allows us to understand the detailed metal-CeO₂ interaction and its effect on low temperature CO oxidation reaction.

210 Experimental Physics: Calculating the Radius of the Earth using Solar Displacement and Global Positioning Systems

Andy Morgan

Originally observed by Erasthones, the Greek mathematician, geographer, and astronomer, the method of radius calculation through Solar Displacement was formulated. To this day, the same method is still accepted along with more complex and technical calculations due to modern technology. Contrary to public belief, the Earth is not uniquely spherical, but widest at the accepted equator location. To greater understand the process of experimental physics; calculations regarding the radius of the earth were performed with respect to Solar Displacement and modern Global Positioning Systems (GPS). Without assuming any accepted values, I took measurements approximately 1000 km apart at specific times to determine the displacement angle inside of the Earth. Using trigonometry, the radius of the Earth was then calculated and possible error was analyzed. This presentation will showcase the calculated data of experimentation along with final resultant measurements.

211 Characterization of Substrate Specificity of β -Glucosidase BglX from *E. coli*

Joshua Weimer, Benjamin Clement, Kole Gasior, Aubrey Hale, Melanie Welsh

The gene *bglX*, which is located in the *E. coli* genome, encodes a protein with the assigned function of β -glucosidase. In other terms, the BglX enzyme is specialized in cleaving β -glycosidic bonds between glucose and other molecules, releasing glucose for energy. Our research shows that BglX can hydrolyze lactose, a disaccharide containing galactose and glucose linked by a β (1-4) glycosidic bond. This suggests that the enzyme may have a different specificity from what was originally predicted. In this study we tested the activity of BglX and several of its previously created mutants toward variety of carbohydrate substrates using either direct or coupled spectrophotometric assays. We found that neither the native enzyme nor mutants can hydrolyze maltose and cellobiose, disaccharides consisting of two glucose residues linked by an α (1-4) and a β (1-4) bond, respectively. In contrast, BglX and its mutants demonstrated higher activity with the model substrate o-nitrophenyl- β -galactoside (ONPGal) than with structurally related glucose-containing compounds. The catalytic parameters of BglX and several of its mutants with respect to lactose and ONPGal were determined.

212 Analysis of a 5 Ton Portable Gantry Crane

Dom Sikora, Michael Stanley, Jennifer Hamill, Sam Trimm, Michael Seifert

Gantry cranes lift objects with a hoist on horizontal rails under a beam. Gantry cranes are useful because they can lift heavy objects that would be impossible or dangerous for humans to lift on their own. Crane design codes and schematics were used to design a crane that would be safe to use. A 5 ton portable gantry crane with an I-beam cross section was analyzed for this work. This work investigated the design of a beam using classical stress and Finite Element Analysis (FEA). Different beam materials were investigated to determine if the beam could be designed with a new material and still have a decent factor of safety. FEA was conducted on the beam to determine the stresses on the beam. The FEA also located positions of high stress concentration; this information was used to help lower the stress concentration on specific areas of the beam. Various dimensions and lengths of I-beams were investigated and used to optimize a design for the beam. Theoretical Stress and Strain Analysis calculations were used to verify the point of failure of the beam in FEA. The flanges of the beam were also examined using FEA. The final design of the beam was determined to be safe based on FEA analysis and was validated by stress calculations.

215 Activity of Lactase in Three Commercial Supplements

Allison Guerrieri, Rachel Centofanti, Samantha Mock

Lactose intolerance is caused by the deficiency of the enzyme lactase, beta-galactosidase, which breaks down lactose into glucose and galactose. The objective of this study was to determine the amount and activity of lactase in three commercial lactase supplements: Lactaid, Schiff Digestive Advantage, and Walgreens Lactose Relief. The Bradford protein assay was used to find the amount of protein in the supplements. Direct spectrophotometric assay was used to determine each of the supplement's activity of lactase toward a model substrate, ortho-nitrophenyl-beta-galactoside. Enzyme coupled assay was used to find the percent of lactose hydrolyzed by the lactase supplements. The results indicated that all three supplements contained protein and demonstrated similar enzyme activity in the direct assay approach. Contrarily, in the enzyme coupled assay method, Schiff Digestive Advantage supplement was significantly more active compared to both, the Walgreens and Lactaid Supplements.

217 A.R.M. (Animatronic Response to Motion)

Lasrry Frangos, Michael Robison, Nick Sirianni, Joshua Welsh

As technology continues to advance, the fields of motion control and robotics can afford humankind with endless opportunities. The goal of this project is to demonstrate the possibility of a few of the most significant opportunities. This has been accomplished through the creation of a motion control sleeve

meant to be worn by an operator for the purpose of controlling an animatronic arm. The design covers three phases of robotic control: perception, processing, and action. Commands are issued through motion sensors mounted on the controller sleeve, using natural human motion. The generated motion data is then processed using an Arduino Mega to create motion control signals. This processed data is finally used to actuate a functional animatronic arm. Cutting edge 3-D printing technology has been utilized to fabricate the structure of the arm. Potential benefits to society through further development of motion controlled robotic interfaces are numerous. Examples of these benefits include the preservation of human life in disaster scenarios and the use of virtual reality rehabilitation programs to aid victims of traumatic brain injuries through coordination exercises.

221 Aryl Azides in the Conversion of Alcohols into Carbamates

Cephas Afeke, Caleb J Tatebe

Azides can be employed to synthesize a variety of organic compounds; however, the hazards associated with ionic azides have been a complication in research. The application of these azides has been important as a route to a variety of compounds, for example, via the Curtius rearrangement. Covalent azide sources have proven to be a safe alternative precursor of ionic azide in the synthesis of carbamates, because they have industrial and biological applications due to their stability. Benzoyl azides have been identified as viable targets for this synthesis. Benzoyl azides with varied substituents have been studied in this work and utilized to synthesize highly-stable carbamates from different alcohols. Here we will present our work on attempts to synthesize new compounds that are closely related to natural products.

222 Ontogeny of locomotor performance in Eastern cottontail rabbits: Hindlimb muscle architecture and fiber type.

Jacob A. Rose, Gabrielle Russo (Stoney Brook University), Jesse Young (NEOMED), Gregory Smith (Akron University)

Rabbits have powerful hindlimb muscles that allow them to accelerate rapidly during locomotion. Moreover, juveniles may have performance advantages relative to adults. To investigate the ontogeny locomotor performance and morphology, muscle architecture and fiber type of the hindlimb extensors were quantified in nine juvenile and six adult cottontail rabbits (*Sylvilagus floridanus*). Muscle mass, belly length, fascicle length, and pennation angle were measured and used to calculate estimates of force and power. Muscle fiber type distribution was determined by electrophoresis and immuno-histochemistry techniques. The hip extensor muscles are massive and capable of relatively high force and power output. In addition, the hip extensors of juvenile and adult rabbits have high fascicle length-to-muscle length ratios, indicating similar muscle shortening ability for high power generation. The ankle extensors are capable of similar force and power; however, statistical analysis among the muscle groups shows no significant differences in peak force between adults and juveniles with the exception of the ankle extensors. Juvenile rabbits also have relatively faster contracting muscles in their hindlimbs as compared with adults. These morphological features suggest that juvenile rabbits have a similar accelerative capacity as adults.

223 Sharing a Journey: A Study of Musical Communication in the Video Game, Journey

John Vitullo

As Musicology continues to evolve and change, one particular area of study that has emerged over the years is Ludomusicology, the study of video game music. A new field of research, many have talked about the dynamic nature of music in games but little is written about the communicative nature between player and music. Journey is unique in that the soundtrack is used as a tool to provide feedback to the player and to communicate between players connected online.

The first area of study that my paper will cover is the idea of using music as feedback to guide the player through the game. The second area of study is in how players in Journey communicate to each

other using musical “chirps” and how the unique communication system blurs the line between diegetic and non-diegetic music. Journey’s soundtrack is the best example of both of these techniques and studying this game reveals new insight to us as humans, gamers, and, most importantly, musicians.

224 Fashion and Social Media

Lauren Furgan

The purpose of this study is to examine how students use social media to acquire fashion ideas. In the fashion industry, social media plays a major role in the growth and success of a fashion brand. The beauty of social media is that it can be accessed at one's fingertips. Whether it be a mobile app, fashion blog, Twitter, Tumblr, Facebook, or YouTube, all of these sites are used daily by millions of people across the globe. The internet has taken over the fashion industry and almost every designer or fashion line has a Twitter or Facebook account. The internet is a great tool for businesses to use to connect millions of customers by the use of advertisements, news, promotions, or events to spread the word about their company. Social networking sites create a relationship between a brand and its customers that didn't exist only a short time ago. This recent popularity of social sites has revolutionized the fashion retail industry and can only excel from here.

In this study data was collected using the fashion and social media survey. Volunteer students filled surveys in various YSU classes in Spring 2014. Results indicated that majority of participants were females 87.3 %, while males were 12.7% percent. Fashion merchandising students made up most of the study participants at 60.3%, while Hospitality Management made up 19%, and Food and Nutrition made up 9.5%. The social media technologies that were examined are Facebook, Twitter, Pinterest, Tumblr, and Instagram. Surprisingly, Instagram and Pinterest were used the most to acquire fashion ideas with Instagram being at 61.9% and Pinterest at 41.3%. This researched indicated students are more visually inclined.

225 Prehospital spine immobilization: a class III medical intervention

Matthew Ozanich

Everyday clinical practices with respect to spinal immobilization are at a turning point. On an international level the field of emergency services has adopted selective spinal immobilization protocols and policies with great success and without negative incident. The one exception to the shift in standards remains the fragmented system within the United States. Irrational fears and blindness to current research have held the system below the international standard, and it is time for that to change. Not only does traditional spinal immobilization neglect to prevent spine movement but coupled with its blatant ineffectiveness is a concerning list of life-threatening complications. These complications include, but are not limited to: increased mortality (Haut, et al., 2010), breathing inhibition (Bauer & Kowalski, 1987), airway compromise, unnecessary pain and suffering, excessive movement and distraction of the spine (Engsberg, et al., 2013), increased intracranial pressure, claustrophobia, exposure to the cold, and decubitus ulcer formation. Proven alternatives already exist and should be implemented without delay to avoid these complications.

226 Pellet Stove TEGs

Ryan Lewis, Nick Onderko, Shawna Higgins, David Deckant

Pellet stoves are ideal heat sources in a variety of environments such as isolated housing and other remote locations where conventional resources are not available. Despite their versatility, there are certain drawbacks in their use including the need for an electrical source for ignition and powering fans for convection. Using the waste heat from the exhaust from the pellet stove and thermo electric generators (TEGs), the need for an outside electrical power supplementation is eliminated. Using commercially available TEGs, various heat exchangers were designed and evaluated using SolidWorks Flow Simulation based on the design parameters such as mass flow rate and heat content of the waste exhaust gas. The modules were designed to meet power requirement, be installed inline of existing

equipment, regulate heat, are cost effective, efficient, and will be compatible with a lithium-ion battery system. Aspects of heat exchanger and system design will be discussed in terms of performance and functional requirements.

228 YSU SAE Baja Car: Design and Fabrication of Body Elements

James Schuster, Eduardo Bustillos, Christopher DeChellis , Benjamin Tadla

During this project, various materials were evaluated based on cost, weight, and strength in order to determine an ideal material for the body structure of the YSU SAE Baja Car. Tuffak A, a polycarbonate produced by Alro Plastics, was ultimately selected to be used for the elements. Also, quick-release fasteners, known as Dzus Fasteners, were chosen to hold the panels in place. The elements were then subjected to cutting and bending in order to fit the skeleton of the vehicle. These areas were created using a SolidWorks 3-dimensional drawing of the Baja chassis, and later compared with the actual chassis itself. A formal analysis of the material and its properties was performed, and future YSU SAE Baja Car events were noted in reference to the nearing competition this summer, and overall state of the vehicle was also included in the poster summary.

231 Inadequate Sleep During Hospital Stay and Delayed Recovery Times

Cassydy Dawson

There is great awareness that needs to be raised with regards to healthcare providers on the importance of sleep and the healing process of their patients. When it comes to treating patients, sleep should be just as important as the medications and testing procedures performed to aid in the treatment and healing process. The purpose of this study was to investigate sleep patterns in the hospital setting. The prevalence, clinical setting, sources and types of disturbances were explored. One hypothesis was tested: Inadequate and fragmented amounts of sleep in hospitalized patients can lead to delayed recovery and discharge time. Methods: A 15 question survey was utilized to evaluate sleep and sleep disturbances while an inpatient at the hospital. Informed consent was obtained. The survey was distributed to patients in a physician's office during normal routine visits. Results: In all surveys, the patients admitted there were many contributing factors to their poor sleep hygiene. The factors include but are not limited to pain, noise, anxiety and discomfort. Of the 40 subjects surveyed, all (100%) felt that sleep is important to their overall well-being. None of the patients considered themselves sleep deprived upon admission to the hospital. When asked the amount of hours slept at home on average per day (pre-admission) versus the amount of hours slept while admitted, all forty patients (100%) documented a decrease in the amount of hours slept while hospitalized. All forty patients (100%) admitted to the hospital said that they were awakened when they slept. Conclusion: All of these plus many other factors have been linked to patients not receiving the adequate amount of sleep to promote healing and a successful recovery leading to increased recovery times.

234 CPR certification among faculty at elementary schools

Jill Grove

The purpose of this study was to investigate cardiopulmonary resuscitation (CPR) and First Aid skill sets among elementary school faculty members. The prevalence, school setting, sources and feelings toward administering both CPR and First Aid were explored. One hypothesis was tested: Faculty in elementary schools are not prepared or trained to administer CPR or First Aid skills. Methods: A 16 question survey gleaned data to evaluate CPR and First Aid skills and feelings in regards to the training received. Informed consent was obtained. The survey was distributed electronically to elementary school teachers, grades K-5. Results: A total of 40 of a possible 40 (100%) participants completed the survey. All 40 participants (100%) surveyed had never resuscitated a victim while at school, while three (7.5%) of individuals, removed a foreign airway obstruction from a victim while at school. An alarming twenty two (53.6%) percent of individuals felt that they would not be able to handle an emergency situation that required CPR/ First Aid independently until help arrived. Thirty seven (90.24%) of the individual's job titles

do not require them to hold a CPR certificate. All 40 (100%) of the participants responded that having a CPR/ First Aid certificate would be beneficial to the school and the students, however when asked if teachers should be required to obtain certification nine 22.50% of individuals are unsure if they individually should be required, and three (7.50%) responded they should not be required. When asked if the school had a crisis plan or procedure for medical emergencies, 23(60.53%) answered yes and 16 (42.11%) answered No. Conclusions: With proper CPR and First Aid training, encouragement and practice, elementary school staff can create a confident and safe environment for all of our society's youth. With CPR and First Aid training more individuals could become first responders to an emergency situation. Having more responders in an emergency or crisis situation would improve the time delay in saving a life. It seems that by the results of forty individuals 100% of them would agree that having a full staff CPR and First Aid certified would be beneficial to the school and the students. The more first responders there are in a crisis or emergency situation the better the outcome for a child will be. Not to mention the feeling of appreciation an individual or a family member would have for the first responder who saved the life of a loved one.

235 A study of bodybuilders and their predisposition to sleep disorders

Alex Mostoller

The purpose of this study was to investigate the likelihood that body builders are predisposed to sleep disorders due to their lifestyles. The prevalence of poor sleep patterns, workout schedules and Epworth Sleepiness scores (ESS) were all explored. One hypothesis was tested: Due to the numerous lifestyle factors that bodybuilders face, they are predisposed to sleep disorders and poor sleep hygiene. Methods: A 15 question survey and 8 question Epworth Sleepiness Scale gleaned data to evaluate body builder's predisposition to sleep disorders. Informed consent was obtained. The survey was distributed at the Arnold Sports Festival in Columbus, Ohio. Results: A total of twenty seven participants completed the survey. A significant correlation was made between body builders training times and Epworth sleepiness scales. Body Builders and Sponsored Athletes who train during the afternoon have a significantly lower ESS (7.6 ESS) compared to the Body Builders and Sponsored Athletes who train during the morning (13.1 ESS) or night hours (12.2 ESS). Twenty of the participants (74%) reported a neck size that puts them at risk for Obstructive Sleep Apnea. The average ESS scale among participants was 11.7 which categorize them into the medical severe risk category. Conclusions: There is a huge emphasis on the need for sleep education in today's society. Dearth amount of date is available linking sleep disorders with the body building population, however now we have a bridge connecting this specific lifestyle to sleep disorders.

236 Elements of Communication that Obstruct Consequences for Sexual Harassment in the Workplace

Karli Rupert

Although it may appear that female professionals have advanced in the workplace due to status and responsibilities, it is unfortunate that they still face unwarranted sexual interaction by their male counterparts in organizations. This critical research study exposes how the vague definition of sexual harassment creates various meanings amongst individuals. Research examines how ambiguity, social acceptance, and organizational culture are all constituents on determining whether or not unwarranted sexual behavior will be condoned in the workplace. Recognizing these subtleties can help improve conflict management in the workforce.

238 Posting Your Way into General Life Satisfaction: An Analysis on Facebook Usage and Personality Type

Jaimie DeMaiolo

The objective of the study is to examine the relationship between personality type, Facebook usage, and the general life satisfaction of college students. Previous research indicates Facebook usage has a

negative impact on college level student's depression and anxiety levels, and an overall decreased life satisfaction (in terms of depression, jealousy, and envy).

I hypothesize students using Facebook more frequently with introverted and/or neurotic personality types will be more likely to have a negative impact imposing on their overall quality of life satisfaction.

The experimenter administered a series of computerized and paper tests including the NEO-FFI-3, Beck Depression Inventory, the General Life Satisfaction Scale created by Diener, a demographics questionnaire, a Facebook questionnaire, and an envy/jealousy scale. Data collection is currently in progress.

240 Raspberry Pi Cluster Website Server

Michael Weaver, Ashley Wagner

This project's goal was create the cheapest, fastest possible web server with available funds. Seeking the cheapest and quickest way to scale a web-serving environment was kept in mind throughout planning this project. We designed and implemented a clustered web server comprised solely of Raspberry Pi nodes. Raspberry Pis are credit card sized computers which were initially created as an affordable method to teach students how to program -- each costs approximately \$45. These Raspberry Pis are networked together and paired with a load balancer. The load balancer serves the purpose of distributing incoming traffic equally and accordingly so not to overload any one Pi. The Pi's also provide multiple sources for any information which may be requested by the web server's traffic. We are hoping to attain similar performance to a modern web server at a fraction of the cost and power usage. The methods, hardware, and software utilized are extremely scalable. They are documented on the website the project currently hosts.

241 Clinical Polysomnography Competencies Graded vs Pass/Fail

Aly'cia Longmire

The purpose of this study was to investigate whether Polysomnography clinical faculty and Polysomnography students preferred pass fail competencies or graded competencies. The preference, skill level and the correlation between competency tasks and overall knowledge were explored. Two hypotheses were tested: Graded Polysomnography competencies will give a better assessment of a student's skill level than a pass/fail competency and Clinical faculty will prefer the graded competencies compared to the pass/fail competencies. Methods: A thirteen question survey for the students and a twelve question survey gathered data to evaluate the competencies. Informed consent was obtained. The survey was distributed electronically to the students and clinical faculty via Survey Monkey. Results: A total of five students and five clinical instructors completed the survey. All five (100%) clinical faculty preferred the graded competencies while only two students (40%) preferred the graded competencies. When asked if they felt that the graded competency gave more of an insight to the student's skill level four (80%) clinical faculty answered yes and three (60%) students agreed. Conclusions: With pass/fail competencies often times students are not aware if they pass if flying colors or just barely passed, whereas with graded competencies, they offer a solid assessment of student's performance. Yet students did not prefer the graded competencies. Fifty percent of the students said that their stress level increased when doing the graded competency versus the pass/fail competency.

245 Gift Giving: an Economic Perspective

Corinne Bocci, William Cochran

This project examines the factors that influence gift giving in American society. Data for this project was collected from 200 Youngstown State University students. The students in the sample were given a survey that asked them to indicate their income, age, gender, major, occupation, ethnicity, and the total number of people in each relationship group. The survey also asked the students to estimate the total number of gifts they have given within the last year, how much money they spent per gift on average, how much time they spent searching for or making gifts within the last year, and how many gifts they have

received within the last year. In order to analyze the collected data, this study uses a linear regression model to analyze how income, age, gender, and ethnicity influence gift giving to primary and secondary kin. Although the results of our study did not pinpoint a specific factor that contributes to gift giving, our study shows that gift giving behavior varies among people of different ages, incomes, and ethnicities and can also vary depending on a person's relationship to the gift giver.

246 Factors Affecting Education Leadership Doctoral Program Attrition

Jason Mays

This research program evaluation observes and scrutinizes the factors that influence doctoral (EdD) attrition in the Educational Foundations, Research, Technology, and Leadership (EFRTL) Department of The Beeghly College of Education (BCOE) at Youngstown State University (YSU). The student, university, existing body literature, and the professional field of education are mutually invested in education leadership/administration (ELA) doctoral program completion and attrition. YSU's BCOE EFRTL Department boasts a preeminent principal licensure examination passage rate (Dick, 2014), as well as an accelerated leadership appointment rate. EFRTL graduates occupy significant educational leadership influence within the State and region. The YSU EdD completion rate however, is not comparable to its professional influence; thus, the subsequent hypothesis is 'shouldn't it be?' Consequently, the data and information derived from this study will inform EFRTL faculty and student practice and program protocol, while also recommending improvement opportunity motifs for contributing to the cadre of literature concerned with ELA doctoral attrition. This objective is two-fold: 1) provide credible evidence to existing scholarly literature and, 2) provide evidence to YSU's EFRTL department that is credible and actionable (Bickman and Reich, 2008; & Julnes and Rog (2008).

247 A Qualitative Analysis of Changes in Social Relationships across the Lifespan

Gina Mancini, William Erskine, Christina Slavens, Krystle Van Dyke, Elizabeth Winston

As a person develops throughout the lifespan, they change cognitively, behaviorally, emotionally, and physically. Furthermore, humans are characterized as social creatures, so naturally social relationships would be affected by these changes. The purpose of our research was to discover both how those relationships change as we get older and how our thinking of those relationships also changes in terms of friends and family. We hypothesized that family would be viewed as most important in childhood and middle through late adulthood, while friends would be viewed as most important in adolescence through early adulthood. In this study, interviews were administered to participants from varying age groups and analyzed for overall themes. Results supported our hypothesis showing that there is an evident shift of importance between family and friends throughout the stages of development.

251 Individual Differences in Resiliency and Childhood Environment in the Context of Counter-Preference Problem-Solving

Lisa Ridgley

A number of factors influence the ability to find the solutions to everyday problems. Previous research has linked expertise (Bédard & Chi, 1992), self-confidence, interest, beliefs, metacognition (Lester, Garofalo, & Kroll, 1989), and affect (Isen, Daubman, & Nowicki, 1987) to problem-solving abilities. This research relates the interdependent factors of childhood family environment, resiliency, personality, and problem-solving preference to problem-solving performance in collaborative and independent problem-solving contexts. These factors will be analyzed using a series of multiple hierarchical regressions. It is hypothesized that analyses will reveal that higher levels of resiliency, built possibly out of the individual's childhood family environment, will mediate the performance effects of placing participants in a counter-preference problem-solving situation. As problem-solving is inherent in daily life, understanding the variables that contribute to individual differences in these abilities is important, and can be used to develop interventions to improve one's approach to problem solving in independent and/or collaborative contexts.

252 Design Challenges in Smart Clothing

Samantha Nelson

Smart textiles have come a very long way since the 1800s. They started as simple belts and corsets and have now evolved into something that nobody could have ever imagined! Currently, there are garments that can sense and react to a person's skin or the environment they are in. Also, there are garments who incorporate LED lights for visibility, garments which soften or stiffen based on the wearer's body movements, shirts which can monitor and correct heart rates and body temperatures, and vests which can monitor a baby during sleep to ensure the health and well-being of children or patients. Although smart textiles are rapidly expanding and advancing, it is a very challenging matter to physically produce these "smart" garments. The purpose of this study is to recognize the current and future functional and aesthetic purposes of smart textiles and to identify the challenges in their design and development.

253 Comparing Tropical Rainforests to Tropical Montane Cloud Forests in Costa Rica

Shannon J. Doherty, Kaite A. Frederick, Erin J. Freed

Costa Rica is a country known for its diverse ecosystems and biomes, such as tropical rainforests, tropical montane cloud forests, mangrove forests, Atlantic and Pacific coastlines, and coral reefs. Containing 13 different ecosystems that house approximately 850 bird species, 250 mammal species, 1,300 orchid species, 175 amphibians, 225 reptiles, and 315,000 insect species, Costa Rica contains approximately 5% of the Earth's biodiversity. Much of its biodiversity is seen in tropical rainforests and tropical montane cloud forests, two very important and unique ecosystems. While both ecosystems contain lush flora and fauna, they do differ in terms of climate, wildlife, and vegetation. However, both of these biomes suffer from severe human impacts, such as rapidly growing populations, logging, agriculture, farming, and climate change. This observational study was to compare and contrast the biotic and abiotic features of both tropical rainforests and tropical montane cloud forests that was seen during the Costa Rica Field Ecology trip in March 2014.

255 The Opium Poppy: A Hypnagogic Trance of the History and Employment of Powerful Narcotics

Floyd Kenney

An expository presentation of the tumultuous history and contemporary applications of the alkaloid derivatives of the Opium Poppy, *Papaver somniferum*, this exhibition offers information consolidated from many spheres of context. Though a foremost focal point is established on the pharmacological implementations of several opiates (morphine, codeine, thebaine, etc.) and their chemical nature, botanical, historical, cultural, and legislative themes will also be addressed. With an infancy commencing almost 6,000 years prior, the immense magnitude of information relating to medical and recreational use of opioids in various parts of the world (Europe, Asia, and Africa) at various moments in the past, eventually manifested as opioids in the New World. The establishment of modern science later piloted their almost unparalleled impact on medicine, as well as illicit drug use. From oxycodone to heroin, almost all opioids exhibit an inherent potential for abuse due to the development of physical dependency and the prospect of psychological reward.

256 Parenting styles as a model for university teaching styles: Connections to motivation and student achievement

Joshua Stephens

The purpose of this study was to examine the differences in student academic performance and motivation in relation to teaching style in the college setting. Undergraduate students at Youngstown State University (N = 82) watched a video of an actress portraying either an authoritative, authoritarian, permissive, or neglectful style of teaching and took a test created for this study, as well as a state

motivation scale. The hypothesis was that students who watched the authoritative video would be more motivated, as well as score higher on the administered test. Results indicate that students scored significantly worse on both the test and motivation scale in the authoritarian group than in the authoritative and permissive groups.

258 Modeling Traffic Flows with Cellular Automata

Tim Shaffer, Eric Shehadi

In this presentation, a cellular automaton based model is presented that tests the viability of left lane passing laws, which require drivers to stay in right hand lanes unless passing other drivers, under various conditions. This situation lends itself to modeling with cellular automata because of the roughly grid-like layout of multi-lane highways and because of the local decision making processes employed by drivers on a road, which include consideration for nearby drivers, highway surface conditions, distractions, etc. The cellular automaton model, written in Lisp, is tested under variable conditions tuned using published experimental data. General trends were observed in averages of trials performed using Monte Carlo techniques that elucidate probable relationships between actual, observable variables. The most thoroughly studied variable was the effect of left lane passing laws on traffic systems. Due to the nature of left lane passing laws, an increase in variability for drivers on the road is observed in the model. Drivers pass each other more frequently and the model reflects this with worse safety conditions and more congestion for drivers. The safest laws would have no restrictions on driver lane choice, reducing the variability of the traffic system and positively affecting driver experience.

260 Hydride Generation Laser Induced Fluorescence Study of Bismuth

Eric Kennehan, Michael Macinga

Hydride generation laser induced fluorescence (HG LIF) is a promising technique for trace level measurements of bismuth. The basis of this technique was studied by Gondi et al in 2013. This research focused on the simplification of the detection apparatus from a monochromator/photomultiplier tube (PMT) to an optical filter/PMT. The limit of detection was also improved upon by using a more powerful laser from 0.030 ppb to 0.015 ppb. This setup utilized a Nd:YAG pumped tunable dye laser operating at 613.530 nm which was frequency doubled to produce ultra-violet radiation at 306.765 nm. Measurements of bismuth were performed in reference materials and showed good correlation with data obtained from inductively coupled mass spectrometry (ICP MS). Tea and spice samples were also measured, although optical interferences were noted in the HG LIF method after a microwave digestion process. The results show significant improvement and simplification of the technique described by Gondi et al. This research will continue with an in depth study of germanium utilizing the same laser setup and detection scheme.

262 Observations of Human Impact on Costa Rica's Environment

Kayla Coldsnow, Heather Miller

Costa Rica is one of the world's top places for ecotourism, may have the happiest population in the world (according to survey results), has some of the greatest ecosystem biodiversity, and has demonstrated indicators as the "greenest" country in the world. Our purpose was to observe and evaluate environmental issues and human impacts during a 9-day excursion in March 2014. Environmental destruction, pollution, a degree of environmental awareness, and reconstruction characterized different urban and natural ecosystems.

Negative environmental effects included highly populated areas that were controlling and releasing waste and pollutants. However, there were positive indications that environmental awareness implemented years ago has resulted in some relatively clean urban and natural settings. In addition, strict enforcement of environmental regulations, especially in protected and preservation areas contributed to well managed ecosystems around the country. More international and national cooperation are needed to protect these fragile ecosystems.

263 Occupational Therapists' Burnout

Mark Mellott

BACKGROUND: Job related burnout is a growing concern among many career fields, especially in the health care profession. The Maslach Burnout Inventory (MBI), developed by psychologist Christina Maslach, is a widely used survey instrument for measuring job related stress. This study explored the application of the MBI Survey with Occupational Therapists, a profession susceptible to burnout due to its repetitive therapeutic methods and job duties. We hypothesized that Occupational Therapists will have subscales scores that are high in the following categories of Professional Efficacy, Exhaustion and Cynicism. **METHODS:** The MBI survey was forwarded to the webmaster of the Ohio Occupational Therapy Association, who randomly selected 50 registered Occupational Therapists throughout the state of Ohio to respond to the online survey instrument. **RESULTS:** Twenty-two Occupational Therapists responded to the survey. Response rate was determined to be 44% (22/50). Four of the surveys had to be omitted because they were not completed. Eighteen surveys were analyzed in this data. The subjects' score for Professional Efficacy was 29 (high). The subjects' score for Exhaustion was 12.6 (moderate). The subjects' score for Cynicism was 7.3 (moderate). **CONCLUSIONS:** The results from this survey suggest that the participants have a high level of Professional Efficacy, Exhaustion Score was at the moderate level, and Cynicism Score was at the moderate level as well. The results did not support our hypothesis in two of the three subscale categories. The researchers suggest that this study should be repeated on a much larger sample size and access to the MBI data analysis tool would be necessary.

266 Capturing Software Traceability Links from Developers' Eye Gazes

Tim Shaffer, Braden Walters, Timothy Shaffer, Huzefa Kagdi

We present a novel approach for recovering software traceability links from developers' eye gazes. An eye tracker is used to capture eye gazes while developers perform software maintenance tasks within the Eclipse IDE. An algorithm is presented that establishes a set of traceability links from the eye-gaze data of several developer sessions. A preliminary study assesses the feasibility and validity of the approach. The links generated by the approach were validated by another set of developers. Results indicate that our algorithm achieves strong recall if developers accurately perform bug-localization tasks.

268 Los Observaciones sobre Los Efectos de los Humanos al Ambiente de Costa Rica

Heather Miller, Kayla Coldsnow

Costa Rica es uno de los mejores lugares del ecoturismo del todo el mundo, es posible que tenga lo habitantes más alegres (según a los sondeos), tiene una gran biodiversidad, y ha demostrado que es el país más "verde" de todos. Teníamos el objetivo de observar y evaluar los temas ambientales e impactos de humanos durante una excursión de 9 días en marzo 2014. La destrucción ambiental, la contaminación, la conciencia ambiental, y la reconstrucción calificaron los ecosistemas naturales y urbanos.

Los efectos ambientales negativos incluyen las áreas muy pobladas que estaban controlando y emitiendo mucha contaminación. Sin embargo, había indicaciones positivas que la conciencia ambiental ha resultado en ecosistemas naturales y urbanos limpios. También, la imposición estricta de las regulaciones ambientales, especialmente en las áreas protegidas y preservadas, contribuyeron a la conservación de los ecosistemas en el país. Pero, necesitan más ayuda internacional y nacional para proteger los ecosistemas frágiles. (For English version, view Coldsnow, Kayla).

269 Natural and Anthropogenic Disturbance on Costa Rican Coral Reef Ecosystems: An Observational Study.

Daniel Lisko, Justin Waldern, EmmaLeigh Given

Costa Rica has a vast and diverse coral reef ecosystem that harbors many marine species. Corals, although closely related to jellyfish, are stationary animals mainly comprised of hardened calcium carbonate along with gelatinous stinging polyp tentacles. Coral reef ecosystems harbor a plethora of species residing inside of and feeding off of the coral itself, including many fish, algae, and other invertebrates. However, this ecosystem is currently threatened by both natural phenomenon and human activities. Upon conducting an observational study of Costa Rican coral reef systems for Youngstown State University's Field Ecology course, many disturbance factors were observed. In particular, while snorkeling and hiking Cahuita National Park and Puerto Viejo, a tourist town, two contrasting coral reef ecosystems were evident. This can be attributed to many factors including natural disturbances, coastal forests degradation, and human interactions. Without action, the diversity of coral reef ecosystems will disappear.

270 An Analysis of Interest Rate Models

Nick Popovich

An interest rate model is a mathematical model that depicts future interest rates using the short term interest rate, also called the "short rate" and abbreviated as $r(t)$. Four of the main models will be described and investigated to see how each one is different and how they behave under different conditions. First, the models will be described. Second, they will be analyzed under different conditions to see how they behave. Finally, the current Treasury Bill rates will be used to compare the models.

271 Anthropogenic Waste Distribution on Two Bahamian Islands: New Providence Island and San Salvador Island

Hannah Scarazzo, Jaimie Demaiolo

Contrasting beach settings result in differences in the accumulation of human generated waste. The student investigators examined beaches on New Providence Island and San Salvador Island in The Bahamas and compared the beach detritus in different locales. The student investigators took time of day and wave patterns into consideration. Beaches in the population center of New Providence Island, Nassau, exhibited significantly higher concentrations of locally generated waste. Beaches on the west end of New Providence Island (Orange Hill Beach) exhibited relatively low levels of beach waste accumulation. Beaches on San Salvador Island uniformly exhibited low levels of locally generated waste. The highest concentrations of anthropogenic waste were external sources deriving from the open Atlantic Ocean. Beaches on the east side of the island (East Beach) have the highest concentrations of waste material deriving exclusively from external sources. The external sources appear to be a combination of intentional waste elimination by fishing boats, freighters, and small sailing vessels. Other sources include cargo or fishing related materials that may have been inadvertently lost at sea. Beaches on the north side of the island (Graham's Harbor) had low levels of locally generated waste. Beaches on the west side of the island (Long Bay) exhibited negligible amounts of beach waste, some of which was locally generated. Beaches on the south side of the island (French Bay) exhibited moderate amounts of waste, the bulk of which came from external sources. The student investigators examined causes for these variations in beach accumulations.

272 The Evolution of Dissent: Student Protest Before and After the Occupation of Columbia University, April 1968.

Heidi Summerlin, David Simonelli

This thesis examines how student protest on college campuses changed from late 1967 through April 1968 and how those changes that occurred at Columbia impacted the student protests outside of the campus through October 1968. The thesis will consider differences between social circumstances where student protests took place, between the student groups and the influence they had on each other. Communication between student groups was important, and most protest groups had access to

underground newspapers or published them themselves. Often campus officials would ban articles, but group leaders around the world would read these newspapers and be influenced by the other students' actions. The thesis will utilize the mainstream newspapers, underground newspapers, specifically for the larger student protests and compare that with contemporary writings of the student leaders at the protests.

274 Are We Sheep? An Examination of Victims Fighting and Fleeing in Mass Shootings.

James J. Scollione

Since the Aurora Theater and Sandy Hook Elementary School incidences, mass shootings have recently gained popularity in discussion circles; yet, the discussion neglects the unwarranted mass casualties therein. The purposes of this study were to test the fight-or-flight response by relating the number of deaths and injuries to fighting and fleeing for victims, and by comparing fighting and fleeing in terms of the number of deaths and injuries for victims in mass shootings. Ninety-two cases between 1966 and 2012 were studied. Seventy-eight percent involved victims fleeing, whereas 22% involved victims fighting the shooter. Deaths and injuries were positively correlated and statistically significant. Deaths, injuries, and victim responses were negatively correlated and not statistically significant. No difference was found in the number of deaths between victim responses; conversely, a statistically significant difference was found in the number of injuries between victim responses. The results of this study suggested that fighting is the better measure against the shooter.

275 Why Can't We Be Friends?: A Study of Workplace Friendships

Julianna Marsco

People spend a majority of their time at work, for many people, more time is spent at work than is spent at home during the week. Therefore, the relationships that are formed in the workplace can be extremely important. The present paper reviews literature focused on three areas of workplace friendships: the development and factors that contribute to workplace friendships, types of workplace friendships, and the positive outcomes that can lead to better organizational environments. Researchers hope that a better understanding of this type of relationship will lead to higher rates of successful and functioning workplace friendships. Furthermore, a positive outlook could potentially lead to organizations promoting workplace friendships which will allow employees to find support within their organization.

276 Loitering in the Lab: An Analysis of Habituation Sessions on Behavioral Outcomes

Michele Awad, Smriti Gupta

While protocols exist governing the majority of animal research, there has yet to be a consensus on whether habituation to the testing facility prior to preclinical experimentation is necessary. As such, the objective of this study was to determine if the type and duration of habituation affects the behavioral data collected from rats in a preclinical setting. The rats were habituated to varying degrees in the lab and on the Hargreave's apparatus. The time to settle (TTS) and a behavioral response to a temperature test were recorded. The results of the study showed a statistically significant difference between the control and variable habituation groups for the rats' TTS, but there was no significant difference between the variable groups. The findings imply that lack of habituation leads to variation in data, while one habituation session proves sufficient to produce more reliable findings. In conclusion, standard habituation of rats to the laboratory and apparatus allows the animal to experience minimal stress while preserving the accuracy of the data and allowing the trials to be performed with a smaller sample size in a preclinical setting.

278 Studded Wall Leveling Mechanism

Matthew Lehman, Rick Smith, Joe Prosaic

The Perfect Push is a studded wall leveling mechanism used to ensure a wall is square to the floor during building construction. The device is designed to ease this squaring operation by lowering required manpower, increasing leverage applied to the wall, and maximizing efficiency and accuracy of the squaring. The mechanism is designed to minimize weight and maximize efficiency and strength. The Perfect Push was designed using tools including computer modeling and stress and strain analysis and was built by the design team members.

279 A Comparison of an iPad Application and Teacher Presented Material to Teach Children With Autism Identification of Common Nouns

Amanda Gillen

The iPad and other tablets have become increasingly popular in education, but their effectiveness is unknown. Vargo (2013) examined the efficacy of an iPad application and teacher presented material to teach children with autism basic math problems. The iPad presentation resulted in more attempted problems, more correct responses, and less off-task behavior when compared to teacher presented material. The current study expanded on Vargo (2013) by selecting an iPad application with built-in feedback and comparing it with teacher presented material to teach children with autism identification of common nouns. Three students ages 5-6 from an autism educational program were selected to participate in this study.

280 MALDI peptide fragment identification of oxidized bovine serum albumin

David Yash, Joseph Crum

Serum albumin is the main protein and antioxidant in human blood plasma, which serves as a buffer against oxidative stress caused by reactive oxygen species. Previous studies have shown that the oxidation of serum albumin can be used as a biomarker for several pathologies including diabetes mellitus, glomerulosclerosis, and cerebral ischemia. Interest into the oxidation of serum albumin has increased due in part for its clinical, and diagnostic applications of such prevalent, and debilitating diseases. Our interest is to determine the effect of Chloramine T oxidation on 1) methionine (MET) residues and 2) on the formation of cyanogen bromide (CNBr) digested fragments of bovine serum albumin (BSA). 2-D gel electrophoresis profiles of oxidized, and non-oxidized CNBr BSA will be used to identify the oxidized peptide fragments. Preliminary data indicates that a vigorous oxidation protocol (10 mM, 60 min) oxidized all MET residues in the molecule and eliminated the formation of CNBr BSA fragments. A more mild oxidation protocol currently under investigation is expected to yield partial oxidation of MET residues and allow for the formation and investigation of CnBr digested fragments.

284 Characterizing Storm Layers in Coastal Ponds of San Salvador, Bahamas

Derrick Allen, Joe Townsend

San Salvador, the eastern-most Island on the Bahamian archipelago, is subjected to frequent hurricane activity. Low-energy, hyper saline ponds occupy much of the coastal topography. High-energy storms potentially transport carbonate sediment as overwash or aeolian processes. Facies identification indicates a signature of sedimentation spikes not associated with low-energy pond processes.

Pushcores were collected from three ponds across the island with each core being sedimentologically unique. Cores from Salt and Triangle Ponds were muddy overall and punctuated with distinct sand layers, interpreted as storm intervals, whereas Clear Pond consisted of coarser sediment and gravel-sized shell layers. High-resolution grain-size analysis was performed to distinguish storm deposition from ambient pond accretion. Preliminary analyses suggest that dune and beach sands correlate with overwash and aeolian depositional processes and can be distinguished using the particle-size analyzer. That sand in Triangle Pond is finer than adjacent dune and represents an anomaly in terms of grain-size distribution.

287 Youngstown State University Herbarium and Modern Uses

Heidi Hall, Cory B. Powell, Timothy D. Shives, Nicholas P. Karaousis, Brandon T. Sinn

Youngstown State University's Herbarium and Modern Uses

Authors: Cory B. Powell, Timothy D. Shives, Heidi J. Hall, Nicholas P. Karousis, Brandon T. Sinn and Dr. Ian J. Renne, Ph.D

Herbaria are located on university campuses across the United States housing biological records of thousands of plant specimens. Ohio currently has more than 35 herbaria throughout the state and Youngstown State University maintains the fourth largest herbarium to date. Youngstown State University's herbarium contains not only specimens from Ohio and the United States but from many different countries around the world. The vast collection that is contained in the university's herbarium is credited to Professor Carl F. Chuey whom has provided more than 52,000 specimens.

The focus of this study is the modern use of herbaria, and how collections can provide vital data for the documentation of changes in the environment, and historical records for many investigations of science.

290 Exploration of Cyber Security Through the Grid

Mark Calautti, Mark Conway, Corey Dunbar, Thomas Hornung, Brandon Mirto, Justin Moff

From browsing the web to remote surgery the United States relies on wireless communication such as the internet every day. Though revolutionary and greatly beneficial this every increasing dependence does not come free of risk. Security is questionable or sometimes non-existent in many internet connections, which can create easy targets for terrorism.

The purpose of this presentation is to introduce the topic of cyber-security and, specifically, how it relates to a smart grid. An overview of green energy, the smart grid, and cyber-security will be discussed followed by a brief history of the origins of electricity. The presentation will conclude with the direct current (DC) grid envisioned by Thomas Edison, which will transition to the ensuing group.

291 Smart Grid- Security

Michael Slavens, Patrick J Bollinger, Shayne C Brown, Jordan Brown, Mike J Modelski

With many products, security is often an afterthought, especially when it comes to technology. People do not worry about the security of the devices they use until something bad happens to them. One such technology where security must be brought to the forefront is in the smart grid. It, potentially, has many vulnerabilities including in the physical security of the device, the network that it uses, the end points, and the potential abuses of the legitimate uses of the devices. Something as vital as the power grid must be secured as it is upgraded to "smart."

293 Fraud in Nonprofit Organizations

Genna Notareschi

This study examines the occurrence of fraud in nonprofit organizations. Ordinarily, it is often assumed that the likelihood of dishonesty and theft should not be as prevalent in these organizations due to the nature of their business. However, this study discusses and scrutinizes why and how fraud can occur in these nonprofit organizations. This study provides examples of the business climate of different types of nonprofit organizations and illustrates some adverse outcomes that fraud can produce in these organizations. Important preventative measures needed to help detect fraud in nonprofits are also discussed. Overall, this study serves as a lesson that all types of organizations need to vigilantly mitigate the risk of fraud in order to avoid any unwanted financial scandals.

294 Cybercrime: Computer and Internet Fraud

Kocak Ozcan

This study examines the continuing and increased risk to businesses due to cyber threats. Specifically, I examine how technology is aligned with the cyber world, how organizations' controls are adapted to an ever-changing cyber threat and how the risk of cyber threats are assessed and forecasted. In today's worldwide economy, most business is conducted online which creates the potential for new and innovative fraud schemes daily. As technology allows businesses to be more creative to conduct business via the internet, businesses become more vulnerable to cyber-attacks. Detecting cyber-attacks can be costly and time consuming for an organization. More importantly, some organizations fail to detect these attacks until years later. I also examine several motivations for why cyber-attacks are initiated and ways in which organizations can help decrease their risk of occurrence.

296 Overcoming Biases with Systematic Observation

Elizabeth Hanna

The purpose of this study is to find out how much instruction is necessary for people to recognize and compensate for limitations in their logical processing of information. Previous research has identified a common perceptual error called "illusory correlation," which is our tendency to see patterns and correlations when they do not exist. This has been notably demonstrated in the use of psychological tests. This study uses college students as subjects. The subjects are shown 30 Draw-A-Person (DAP) drawings with two symptom statements on each. This test has a person draw a person and from the nature of the drawing and what features are emphasized in the drawing, the psychologist tries to ascertain aspects of the person's personality or current emotional problems. After reviewing the drawings, subjects are asked which characteristics are most often paired with each symptom statement. There are three conditions, each with a different set of instructions, and each progressively giving more specific suggestions designed to decrease the bias represented by illusory correlations. Though there is no correlation between the drawing characteristics and the statements in our set of 30 drawings, we expect the participants to see patterns unless our instructions are able to get them to think more critically and more systematically. The results of this study may improve the way we train people to think critically.

298 Assault Rates in 30 Cities

Crystal Doyle, Nick Danailovski, Ashia Evans

Our research includes a data set for 30 cities in the United States that looks at the mean, median, minimum and maximum of each selected variable. We chose 5 different variables for this project. We looked at the population size of each city, the median household income, median resident age, bachelors degree percentage, and the assault rate. We found several variables had a correlation with the assault rate in the United States.

299 The Effects of Dietary Probiotic Yogurt on the Presence of LPS Producing Bacteria in the Gastrointestinal Tract

Justin Waldern

The gastrointestinal (GI) tract is an incredibly diverse microbial ecosystem that is home to over 100 trillion microbes. Many of the bacteria within the human gut provide a range of benefits to their host, while others cause harm. Gram-negative bacteria, known to inhabit the mammalian GI tract, produce lipopolysaccharide (LPS) as part of their cell wall. Although LPS is essential for the survival of gram-negative bacteria, LPS is harmful to humans because it stimulates an immune response. Primers were developed to specifically amplify the *lpxC* genes (needed for LPS synthesis) of certain bacteria species. This would allow quantification of these species of LPS producing bacteria through polymerase chain reaction (PCR). Yogurt containing probiotic bacteria, which along with other benefits to the host, may affect the abundance of LPS producing bacteria after regular consumption. This change may be detectable using PCR in DNA extracted from fecal samples collected from individuals before and after regular yogurt consumption.

305 Talking to Molecules with Magnets

Patrick Cook

This research presents a method for mapping the x, y, and z components of magnetic fields using Hall Effect sensors and a computer interface. The data from this method is in agreement with methods obtained in literature and is used to study the behavior of magnets interacting with one another. The magnetic mapping data also shows how the shape of magnetic fields can be altered by combining magnets in geometric arrays. Next, research is proposed to test the possible applications of the “new” vs. “standard” magnetic field shapes. This research includes chemical reactions that involve the presence of an unpaired paramagnetic electron during the reaction mechanism. To place this research in a broader context, we outline the progress and ongoing research of applications for shaping magnetic fields.

308 Failure Analysis of Ultrasonic Welds of Aluminum Cables to Brass Terminals Using Analytical Electron Microscopy

Brandon Hart

Aluminum cables are more cost effective and lightweight when compared to standard copper wiring. When using aluminum cables in electric/hybrid vehicles, the problem is poor mechanical properties of the terminal assembly manufactured by mechanical crimping. A potentially effective alternative connection method is through ultrasonically welding the cables to the terminals. The purpose of this project was to analyze two different ultrasonic welds of aluminum cable to brass battery terminals: a successful one, and a failed one. What determines the “success” of an ultrasonic weld is if it passes a tensile stress test. The goal of the analysis was to determine why one passed the stress test and the other did not. The investigation was performed by exposing the weld interfaces of each sample and observing them by optical microscopy (OM) and scanning and transmission electron microscopy, SEM and TEM, respectively. Analysis of the experimental results shows a significant amount of voids in the failed weld, while the successful weld had very few. Investigation of the aluminum wires forming the cable showed significant roughness on the surface of the failed sample wires, while the successful sample had much smoother wire surfaces. Elemental composition analysis in the failed sample showed significant amounts of carbon and oxygen on the surfaces of both cables and terminals. The interface was further exposed by polishing with a focused ion beam (FIB) to get a much clearer view of the interface. It was determined that ultrasonic weld performance depends on the surface condition of the starting materials.

310 Plasma Speaker

Adam Smith, Derek Dowdell, Marcell Vitello

Due to our love and appreciation of music, we are attempting to successfully engineer a fully operational plasma speaker. This speaker will operate using high voltage to create an electrical arc. Since the arc will be able to carry audio signals through the thermal expansion and contraction of the air around the arc, we will then be able to hear the audio signal. Additionally, the air around the arc acts as the diaphragm of a traditional speaker and since this design lacks a diaphragm it cuts down on distortion, hence producing a broad range of frequencies. This plasma speaker will greatly enhance music quality, therefore creating clearer tones and melodies. Our plasma speaker lacks internal movable parts; subsequently the speaker is much more durable than traditional speakers. Upon successfully designing this plasma speaker our focus will immediately shift towards the safety and well-being of our customers. We plan to enclose our electrical arc and transformer, as not to cause harm in any fashion to customers.

314 Thermoelectric Generators to Power Pellet Stove Heating Systems

Jacob Orwell, Chris DeChellis, Bruce Hostetter, Benjamin Tadla

The invention is a pellet stove design with multiple thermoelectric generators (TEG's) attached to the exhaust pipe. The purpose of this add-on is to allow the pellet stove to be operational in remote locations

where access to electricity is limited or absent. The main focus of the design is to extract enough heat for the TEGs to properly power the system. The TEG's use the temperature differential between the exhaust air and ambient air to convert the wasted heat flowing through the exhaust pipe into electrical energy via the Seebeck effect. Analysis and optimization was done on the consumption of electricity by the complete heating system to fulfill the purpose of independency. The quantity of heat available was evaluated for various volumetric flow rates, temperature-dependent densities, and temperature differences. Various heat exchangers were then designed and analyzed using SolidWorks Flow Simulation to quantify the amount of heat removed from the working fluid and pressure drop. A heat sink was designed to fit inside the exhaust pipe and to transfer the most amount of heat possible to the TEG's. This energy will provide the blower motors and the auger with the necessary power to run without any dependence to the electrical grid. Also, any excess energy is transferred to a lithium-ion battery to charge it for future cold starts. If the design proves to be successful and practical it is to be patented.

315 Modification and Exposé of a Hexapedal Robot

Massey Fowler, Mark Calautti, Brett Comeau, Tim Daugherty, Lauren Jancay, Michael Slavens. Bryan Zilka

The object of this project was to redesign an existing walking robot and incorporate elements of bio-inspired design into its function. Design improvements were geared toward maximizing the stability of the robot while in motion. Design changes include mechanical, electrical, and reprogramming in order to achieve the best possible result. The robot, at the end of the project, was to be able to walk on six legs and navigate over uneven terrain of varying grades. Additionally, the robot accepts inputs wirelessly via an adapted RC system. The finished robot will be entered into the National Robotics Challenge held in Marion, Ohio on April 10-12, 2014, as well as showcased at the annual STEM Showcase. Furthermore, this project was a multidisciplinary undertaking, involving students in mechanical and electrical engineering and served as the capstone design project for the mechanical engineers involved.

324 The effects of a music-based curriculum on learning, sleep quality, and melatonin levels in children with autism

Jon Dean, Amanda Sacco

Autism Spectrum Disorders (ASD) are a group of neurodevelopmental disorders characterized by social, cognitive, communication, and emotional impairments that affect roughly 1 out of 88 children. 40-80% of children diagnosed with ASD further experience sleep disturbances. Our goal is to quantify the effectiveness of music participation as a novel aid in alleviating these impairments and sleep disturbances in children between 6-11 years of age who have been diagnosed with ASD. 4 children who have been enrolled in a biweekly and hourly rhythm-based music curriculum at the Rich Center for Autism are serving as our experimental group; 4 children who are not, but also attend regular classes at the Rich Center, are serving as our control group. Parents are collecting their child's sleep data for 3 nights in March and 3 nights in May using the Zeo Sleep Manager, a home bedside unit that can detect each phase of the sleep cycle via EEG. We are collecting salivary samples on ensuing mornings for assessment of melatonin concentration via immunoassay utilizing rabbit monoclonal antibodies. Parents are also answering sleep questionnaires during days and nights of physiological data collection and – along with teachers – are filling out questionnaires accessing behavior, academic performance, and social skills in the children. We hypothesize higher melatonin levels, and better sleep quality and overall behavior will be observed in the experimental group. The study will be completed by the end of the summer of 2014.

326 Perception of women in a male-dominated field.

Rebekah Tedde

Although the sports field may have become more accepting of women reporters during the past decade, women who enter sports media careers are still faced with a male-dominated environment that discourages them from pursuing long-term career.

This research study looks at the perception of women in sports media based on attitudes towards women reporters in the male-dominated field. Previous studies that have been conducted help better understand the audience's perception of women reporters, as well as the opinions of readers when reading a sports article written by a female. Research also helps clarify the reasoning for the negative and/or positive perception of females in the media.

327 One Hot Cookie

Rebekah Tedde

The purpose of this research is to analyze persuasive campaign of the company, One Hot Cookie (OHC), which is located in the Downtown Youngstown Area. An audience analysis was conducted of the local business, to better understand their audience, culture and demographics, as well as attitudes, beliefs, and behaviors. A website analysis was then conducted to examine their social media outlets as well as their followers. By understanding the Uses and Gratification Theory, I identified strategies that are commonly used to direct attention, promote emotions, and affect attitudes within their social media campaigns.

328 Pellet Stove Thermal Electric Generation Application

Thomas Bobosky, Zach Abraham, Dakota Joy, Taylor Rapovy

This pellet stove thermal electric generation project looked at the important aspects for use of Thermal Electric Generators (TEGs) and the typical outputs for commercial pellet stoves. The need for a self powered stove arrives with the need for greener, more efficient energy and the potential for well heated homes during power outages in cold conditions such as winter and natural disasters where many homes are left without power and therefore cannot use their furnace or typical pellet stoves. The concept of thermal electric generation uses the temperature difference between utilized exhaust heat and ambient room temperature to create a voltage and current which is then used to charge a lithium ion battery. Important parameters include design of the heat exchanger used in/as the exhaust, the amount of TEGs, placement of the TEG's, and the heat utilized by the TEG. Analysis of potential systems is performed using Solid Works modeling and simulation as well as use of matlab for calculations.

330 Characterization of crystallographic imperfections in ZnO thin films synthesized by radio-frequency magnetron sputtering

Matthew Kelly

Characterization of crystallographic imperfections in ZnO thin films synthesized by radio-frequency magnetron sputtering.

ZnO materials are characterized by wide, direct band-gap (~ 3.3 eV @ room temperature) and exceptionally high exciton binding energy (60 meV). In thin film form, ZnO is highly conductive and transparent. These qualities make ZnO attractive for use in a number of different electronic, photovoltaic, and optoelectronic applications. ZnO thin films grown on sapphire substrates by the radio-frequency sputtering method and annealed at various temperatures have been showed to exhibit photoluminescence at room temperature. There is a direct correlation between microstructural characteristics of ZnO thin film and its photoluminescence (PL) properties, which is not well understood. The purpose of this work is to clarify this correlation using analytical electron microscopy investigation techniques. Cross-sectional samples of ZnO thin films, not annealed and annealed at 2000C and 7000C, have been prepared by focused ion beam (FIB) and investigated using high-resolution transmission electron microscopy (HRTEM). Irrespective of the annealing conditions the ZnO thin films are polycrystalline. Individual grains have a columnar morphology with the long axis oriented perpendicular to

the ZnO/sapphire interface. The grain size is temperature dependent, the largest grains being observed in the 7000C annealed material, which shows the best PL effect.

331 Manufacture of Influenza Vaccine Using Sf9 Ovarian Cell Line

Estee George

Recent years have seen a deviation from the focus on egg-based influenza vaccines. Technology for the manufacture of these vaccines has proven unfit to “provide sufficient vaccine for the population in a timely fashion.” Allergies to hen’s eggs and “decreased antibody responsiveness to influenza vaccine in older subjects” have called for a shift in these traditional vaccinations. Further, the infection of hen’s eggs with the influenza virus is a delicate costly process as the inside of the egg must be kept sterile, and a pandemic may jeopardize the availability of the egg substrate. One promising alternative to egg-based vaccines is the manufacture of vaccines using the cloned Sf9 ovarian cell line from the fall armyworm (*Spodoptera frugiperda*) as a starting material. In a process similar to those developed by clinical-stage biopharmaceutical companies, a flu vaccine can be manufactured by utilizing baculoviruses engineered to express three influenza virus structural proteins: hemagglutinin (HA), neuraminidase (NA), and the core matrix (M1). A multistage layout of the pharmaceutical process designed to engineer this vaccine begins with the formulation of cell cultures to constitute a seed train and ends with the concentration and stabilization of the drug product for distribution. A process description, equipment specifications and costs, and manufacturing costs are crucial to the analysis of the plant.

332 A Comparison of Match-to-Sample and Respondent-type Training of the Blocking Effect in Equivalence Classes

Kristopher Brown

Blocking occurs when previous conditioning with one stimulus reduces, or blocks, conditioning to a second stimulus when the stimuli are later presented as a compound. Basic research has implicated blocking in the domain of equivalence class formation. Although both match-to-sample and respondent-type training are procedures used to facilitate emergent relations, research on the blocking within equivalence classes has only been conducted using match-to-sample procedures. Since the two procedures are based on different types of conditioning, information on the presence of blocking in respondent-trained equivalence classes would contribute to a more coherent explanation of equivalence class formation. Thus, the purpose of the present study was to compare match-to-sample and respondent-type training for their susceptibility to blocking. Scores for participants who only showed some relations between stimuli were indicative of blocking for both training procedures. Results for participants who displayed all emergent relations in the match-to-sample condition were mixed, with some displaying evidence of blocking and others showing the formation of equivalence classes including all stimuli used in training in both experimental and control groups. Both participants who displayed all emergent relations in respondent-training were from the experimental group and subsequently showed the inclusion of the stimulus used in the blocking preparation. Results are discussed as to the nature of stimulus control present in the two training procedures, as well as directions for future research.

333 S.H.A.D.O.W. (Solar Haptic Adjustable Device for OH WOW!)

Michael Currao, Tyler Goodwin, Jacob Tibbits , Ryan Hicks

With the recent increase in technologies of alternative energies, as well as an increase in customer interest for these alternative energies, it is crucial that we begin to educate children on the subject matter at a young age. These technologies will become even more advanced and prevalent in the world by the time the children grow to be adults. Recognizing the importance of teaching the youth about alternative energy, we are working with Dean Abraham and the OH WOW! Children's Center for Science and Technology to create a solar energy exhibit that will be displayed at OH WOW! in downtown Youngstown. The exhibit consists of a solar panel that tracks a light source as it moves above it. The light source moves in the path that the actual sun moves every day from east to west. The power output from the

solar panel will be displayed in the form of a meter on a large touchscreen monitor where the children will also have the ability to adjust the position of the light source to observe how the output from the panel changes. Using this exhibit, children will learn the many advantages of using solar energy as a power source for various applications.

334 In vivo strains in the femur of the nine-banded armadillo (*Dasyus novemcinctus*)

Joseph Copploe, Richard W. Blob, John H. A. Parrish

The capacity of limb bones to resist the locomotor loads they encounter depends on the pattern of the loads (magnitude and loading regime) and the material properties (strength) of the skeletal elements. Our understanding of the interplay between these two factors is primarily based on evidence from upright mammals having limb bones loaded in high bending with minimal torsion. However, crouched mammals show appreciable torsion in their femur in addition to moderate bending, suggesting greater diversity in bone loading than previously indicated. This study records in vivo strains in the femur of the armadillo (*Dasyus novemcinctus*) during treadmill locomotion to test the hypothesis that the patterns of bone loading experienced by armadillos are an ancestral trait of early mammals. Peak axial, shear, and principal strain orientations indicate that the armadillo femur experiences a combination of axial compression, moderate mediolateral bending, and low torsion. Strain patterns in armadillos are similar to our previous data from opossums, however, the unique shape of the femur appears to substantially increase the magnitude of tensile strain experienced. Bone loading regimes across the diverse taxonomic groups studied indicate the strong influence of limb posture, which may reflect the evolutionary patterns of bone loading and design.

335 I Thought You Would Be Taller: Self-Presentation and Uncertainty Reduction Theory in Online Dating.

Rachael Thomas

This study focuses on the amount of information people are willing to disclose in an online dating situation. The study takes a deeper look into the world of online dating and how it coincides with the communication theories of self-presentation and Uncertainty reduction theory. The stance of this paper is that the use of profiles with pictures and extensive details about the person being researched cuts down the uncertainty of the person attempting to make contact. The use of detailed language and emotional words allows the people participating in online relationships to feel a closer bond with each other. The research for this paper come from a wide variety of subjects all pertaining to self-presentation and Uncertainty Reduction Theory in online profiles.

337 Implications for Counseling: Exploring the Mental Health of Parents of Children with ASD

Rebecca K. Szanto

The present literature review focuses on the available research surrounding the mental health of parents of children with Autism Spectrum Disorders (ASD). Raising a child with ASD can be a stressful experience for many parents. The abundance of stress they face often compounds leading to symptoms of depression. The stress of having a child with an ASD may also proliferate into other areas of a parent's life such as marriage and work. Present research has focused on the alleviating effects of coping skills and social support on maternal mental health of mothers with children with ASD. Research findings suggest that there is a great need for specifically tailored counseling for these families. Programs such as Positive Behavior Support (PBS) have been recommended as tools for parents with children with ASD.

338 Duplicate Bug Detection

Sarah Ritchey

Open source projects rely on users to report technical issues or bugs in the software. Occasionally, multiple users will report the same bug. The extra effort to fix these duplicate bugs puts a tremendous strain on software developers. Therefore, detecting duplicates before assigning them to be fixed is essential. This presentation describes an improved method for automatic duplicate bug report detection based on new textual similarity features and binary classification.

340 Development of Procedure to Define the Crystal Structure of Possible Ternary Phase in Al-Si-Ti Alloy System

Jacob Cvetich, Matt Zeller

Aluminum and its alloy with silicon and titanium are known to have varied properties dependent on composition. While many Al-Si-Ti compounds are well studied and defined, particular interest was taken in Al-rich Ti alloys doped with small amounts of Si. In the case of TiAl₃ doped with up to 10% Si, X-ray diffraction powder (XRD) patterns of Si doped TiAl₃ were similar to that of the parent compound, but no actual crystal structure had been reported in the literature. Samples of Al-Si-Ti of varied compositions were produced using an arc melting furnace and annealed under varied temperature/time conditions to increase crystal grains to a size suitable for single crystal XRD. Microstructural investigations and grain/crystal size evaluation were performed with scanning and transmission electron microscopes, SEM and TEM, respectively. A powder XRD instrument was used for collection of multicrystalline X-ray diffraction patterns. Single crystalline particles were extracted using focus ion beam (FIB) techniques. The extracted crystals were transferred onto a single crystal XRD for structure determination. Microscopy investigation showed at least two distinct phases in samples, and an increase in grain size uniformity with annealing temperature. Powder XRD analysis showed the target phase to be similar to the tetragonal TiAl₃ with $a/b = 3.836\text{\AA}$ and $c = 8.579\text{\AA}$. The average grain size in annealed samples was at least 10 micrometers, as determined by TEM. Single crystal XRD shows possible site preferences for Si, which is disordered with the Al atoms. However, no ordering, repeating arrangement, or superstructure was observed and Al and Si atoms form a simple solid solution.

341 Macroinvertebrate diversity as an indicator of freshwater stream quality: Determining biotic health of Connoquenessing Creek post-dam removal

Leah Kaldy

The Connoquenessing Creek located in western Pennsylvania underwent a low-head dam removal in July 2009, resulting in the opening of an impounded stretch of the creek. Prior research conducted at this site indicated that the Connoquenessing transformed from a lentic ecosystem to a lotic system with heterogeneous cobble-substrate one year after the dam was removed. As a result of the dam removal, the macroinvertebrate community adapted to the physical changes of the creek and ultimately became more diversified. Further research was conducted May-October 2013 in order to establish a more up-to-date creek health assessment. Physical parameters of the creek were obtained along with seasonal collection of macroinvertebrates. The routine sampling at the Connoquenessing provides a data set of biological indicators that can be used to determine current stream health, as well as provide an adequate reference for future quality assessments of the creek.

344 The Sarbanes-Oxley Act of 2002: Was it a Success?

Mason Fowler

This study evaluates the perceived success of the Sarbanes-Oxley Act that became effective in 2002. In an attempt to restore the public's faith in the capital markets, Congress adopted this regulation to aid in financial reporting in the public sector. In order to help determine the effectiveness of this regulatory act, this study examines what events lead congress to reform previous rules, the major provisions of the Act, and how its specific provisions can aid in deterring fraud. This study also examines some of the limitations of the Act. Compliance costs under the Sarbanes-Oxley Act have been one of the major focus areas. This study also attempts to illustrate that the core components of the Act and refinements since its

inception have helped to increase perception and prevention of fraud in the public sector, as well as restore faith for investors.

345 Development and Characterization of GC MS and GCxGC MS Techniques for Analysis of Major and Minor Hydrocarbons in Fuel Samples

Stephanie Horvath

The research project is centered around the development and characterization of gas chromatography mass spectrometry (GC MS) techniques for chromatographic analysis of major and minor hydrocarbons in fuel samples. Experiments will focus on the determination of optimized instrumental parameters for performing separations using standard mixtures of aromatic compounds quickly and accurately. The essential parameters to be evaluated include: sample volumes, split ratios, carrier gas flow rates, and oven temperature programming conditions. Two chromatographic methods will also be utilized, both one and two dimensional analysis.

348 Medical Providers and Technology: Who Implements Technology More and the Effect on the Doctor-Patient Relationship

Renee McGraw

The purpose of my research project is to evaluate barriers to healthcare, specifically technology and communication. This study hopes to reveal who is using technology more, for what reasons, and the effect on the doctor-patient relationship. An assumption of this study is that foreign-born healthcare providers are using computer charting as a way to accommodate the language barriers and cultural differences that may occur with patients. The technology under scrutiny is computer charting and the communication under study is bedside manner. Data will be gathered from RN (Registered Nurses) observations working in a hospital setting. The research design is Exploratory with a goal to transition into Explanatory as the research continues. The data collection will be quantitative. Anonymous surveys will be handed out with response choices provided along with the informed consent. Questions asked will address the following; the population under study (foreign born and native-born health care providers); computer charting; communication; and the type of misunderstanding (language barrier or other cultural barrier). In the era of computer charting technology, this research hopes to shine light upon a critical health-care communication gap, the doctor-patient relationship, and the necessity of bedside manner in resolving not only patient dissatisfaction issues but also the difference between life and death. Physicians spend a lifelong commitment to their education and although patients may value their technological expertise, communication skills are rated at a higher level of quality for patients (Anderson, Barbara, & Feldman, 2007, p. 261).

352 A Preliminary Hydrogeochemical Evaluation of the Mahoning River Watershed to Assess Potential Water Quality Impacts From Unconventional Natural Gas Exploration and Production

Derek Scott, Sean Giblin

The northeastern and eastern areas of Ohio are experiencing a drastic increase in oil and gas shale extraction activity, mainly hydraulic fracturing extraction methods, for the past few years. With these extraction techniques much public concern and worry has been expressed in the modern day, with the worry of the public being directed towards how these methods can affect the environment, specifically natural waters and aquifers. Use of total dissolved solids and chloride to bromide ratio information in conjunction with depth profile analysis water samples could serve as a possible indicator whether gas and oil extraction methods utilizing brine water have a direct affect on the local watershed, the Mahoning River Watershed. The total dissolved solids, temperature, and pH can be quantified by using a YSI multi-parameter probe and the chloride to bromide ratios can be determined by using an Ion Chromatography. Analysis of waters from the Mahoning River and Mosquito Lake have not produced clear evidence for possible contamination of those natural water bodies through gas and oil extraction or exploration, which is not unexpected due to the fact that the recent oil and gas extraction boom in this area of the state is

newly formed and still developing infrastructure. These analysis results from the research could possibly be used in a future study of local water quality as pre-drilling to early stage drilling water samples to determine if there is future contamination due to oil and gas exploration and extraction.

357 Development of Plant Alternative Splicing Database

Jonathan Braessler, John Meinken

Development of Plant Alternative Splicing Database

Alternative Splicing (AS) is a process of generating more than one mRNA transcript or isoform from a gene. More than 20% of the plant genes showed alternative splicing. In plants, the functional relevance of certain AS-derived isoforms has been observed in responses to biotic and abiotic stresses. Relative to the predominant transcript, four basic AS types have been observed, including exon skipping, alternative donor or acceptor site, and intron retention. In an attempt to identify and annotate AS genes in plants, we develop a plant alternative splicing database. The database can be searched using key words, gene identifiers, species, and AS types. The database provides an online resource for researchers to select genes for further experimentation. This is also linked to a BLAST and GBrowse search page in order to receive more information in those areas. There are currently 8 species in the database, which include *Brachypodium distachyon*, *Nelumbo nucifera*, *Fragaria ananassa*, *Malus domestica*, *Citrus sinensis*, *Vitis vinifera*, *Rice subspecies japonica*, and *rice subspecies indica*.

360 Examining the Fragmentation of Copper and Nickel Beta-diketonate Complexes Using Computational Methods

Kyle Kemats

The gas-phase fragmentation of several copper and nickel beta-diketonate compounds were observed using mass spectrometry. These complexes were modeled using the computer software Spartan '04, and several rate constants of dissociation were calculated in an effort to explain the resulting fragmentation pattern.

361 FunSecKB2: A Database for Predicting Subcellular Location of Fungal Proteins

John Meinken

FunSecKB2 is a knowledgebase that the YSU Bioinformatics Lab built for prediction of protein subcellular location in fungi. We collect data for all sequenced fungal proteins from a variety of online databases and protein analysis tools. Then we apply our own algorithms to the collected data in order to make our predictions.

One of the primary challenges for us is how to compare the accuracies of different prediction algorithms. As part of the FunSecKB2 project, I have been working on building a web application that assists with this work. The application has an input form for defining a test data set of proteins to generate. The user can also select which algorithms they wish to run. The program then retrieves a data set from our database and runs the selected algorithms. The results can then be imported into Excel or a statistical program for further analysis.

363 Female Imagery in the Upper Paleolithic

Faofua Togisala

Images of the female form represented in the Upper Paleolithic (ca. 30,000-10,000 years ago) artworks are controversial in the archaeological field. The controversy centers around the socio-cultural function of these figures. Early interpretations of these images incorporated the idea of fertility "Venus" figurines and "Mother Goddess" worship as a major reason for the creation of these objects. More recent research by archaeologists expands this "traditional" interpretation to include hypotheses of the importance of

women's industries in textiles, self-portraiture during pregnancy, and portrayal of women at different life stages. Other major critiques offer no hypotheses but target the technical difficulties in assessing the sex and gender of the artwork and any associated meanings. The present research is a meta-analysis of archaeological sites, artifacts, and publications examining the major traditional theories of female imagery in the Upper Paleolithic artwork and to highlight the emergence of new critiques.

364 The Creation of an Artifact Database for the Woodstar site (SS-4) with the Combination of Global Information Science Technology

Steven Campbell

Youngstown State University has a long-term excavation at Woodstar site (SS-4) on San Salvador Island, The Bahamas. Starting in 1995 every December, YSU students and Faculty members have performed archaeological excavations at the Woodstar site. The geographic area was occupied by the indigenous Lucayan people who inhabited Bahamian Archipelago from 600 AD to 100 A.D. Over the years, a vast amount of artifacts and data have been recovered about the Lucayan culture from the Woodstar site. The present project was conducted for database construction of the artifacts by date, location and type. Along with the database construction is the use of Global Information Science (GIS) technology. With the use of GIS technology it possible to create an interactive map of the Woodstar site and combine it with the artifact database for future research. As a result, the database includes all artifacts, units, and year of discovery to create a searchable database and an interactive map using GIS of the Woodstar site for future research.

365 An Analysis of the United Arab Emirates' Foreign Policy Dealing with Rights of Undocumented Migrants and Famine

Greta Frost, Jordan Wolfe

For sixty years, the Harvard National Model United Nations Conference has provided the opportunity for students all over the world to research and debate international policy. This year, the students of the Model UN team at YSU were assigned the country of the United Arab Emirates. In the Social, Humanitarian and Cultural Committee, Youngstown State University students debated topics such as the rights and privileges of undocumented migrants and famine. The international policy of the United Arab Emirates focuses around money, as the nation is very wealthy due to oil reserves. Looking at how much money from oil funds influence the UAE's decisions on humanitarian efforts as well as the nation's relations with other Middle Eastern nations is interesting and important to global politics as a whole.

366 Eddy Current Brake

Joseph Cassata, Kyle Skiba, Rick Chambers

Eddy currents exist in all objects that can conduct electricity and are subjected to changing magnetic fields. These currents will be utilized to improve existing brake systems that currently use mechanical braking. To demonstrate, a small scale system consisting of a rotating disc and coils will show the braking effect. By sending current to the coils, a magnetic field will be created perpendicular through the rotating disc creating eddy currents. Kinetic energy is dissipated through heat from eddy currents. Due to Lorentz force, eddy currents will create a force opposite the discs motion, stopping the disc. These are the operating principles of our eddy current brake.

369 Pediatric Nursing Knowledge on Short Acting Beta Two Agonist Nebulization Treatments Vs. Metered Dose Inhaler Treatments in a Pediatric Asthmatic Patient

Sara Dorris

Purpose and Implications for Nursing: To assess the knowledge level of a pediatric nurse has between a short acting beta two-agonist nebulizer treatment Vs. MDI administration of the short acting beta two

agonist. In America the number of children who currently have asthma: 6.8 million percent of children who currently have asthma: 9.3% (CDC-Asthma, 2014) Asthma among pediatrics is on the rise with a 50% increase. From 2001-2009 the greatest rise was seen among black children (CDC-Asthma, 2014). Asthma costs the United States \$56 billion each year, and averaging a yearly cost of care for a child with asthma \$1,039 in 2009 (CDC-Asthma, 2014). No literature was reviewed that showed a study of pediatric nurses' knowledge of nebulizers vs. MDIs with spacers in treatment with beta two agonists in asthmatic patients. The proposed study is important to identify the knowledge and need for education of pediatric nurses. Methodology: Subjects: Pediatric nurses from a pediatric floor or emergency room setting. Exclusions: Nurses whom don't administer beta two agonists. Inclusions: All licensed registered nurses actively working as a staff nurse on an approved floor for the study. Approval: Will come from hospitals IRB, and all floor managers. Setting: Northeast Ohio. Measurement: A pre-test and Post-test will be developed by Analysis: SPSS will be used to analyze data. Descriptive statistics will be analyzed as well. A t-test will be preformed to determine the knowledge level between the nebulizer and MDI with spacer of the pediatric nurse pre and post education. Findings: Full results and statistical analyses are pending. Center for disease control & prevention (CDC). (2014, March).

371 The Human Oral Microbial Communities of Six Healthy Adults, and the Abundance of Resistance Genes.

Jonathan Guy, Zachary Marinelli

Antibiotic resistance in bacteria is a major health risk and antibiotic resistance genes are becoming more prevalent. Antibiotics, although a widely used treatment, leads to increased rates of mutation and conjugation resulting in resistance genes. TetM and TetW, both tetracycline resistance genes, appeared to be more abundant in healthy subjects than BlaTEM (a beta-lactam resistance gene), or Erm C (erythromycin-resistance gene). The objective is to determine the effects of tetracycline treatment of periodontal disease on the abundance and distribution of antibiotic resistance genes and on the presence of pathogenic bacteria associated with periodontal disease.

Paper points were used to collect the oral biofilm of 6 healthy individuals who have never had periodontal disease. All samples were positive for TetM, but only one sample was positive for TetW. Neither BlaTEM nor ErmC were detected in any of the samples. These preliminary data indicated that tetracycline resistance is very common in human oral biofilm communities and has implications for the effectiveness of oral tetracycline treatment for periodontal disease. We will begin clinical trials with samples from patients with periodontal disease.

373 Media Analysis of The CW

Melissa DelSignore, Corey Lynch

The CW is the newest of the five commercial channels in the United States, FOX, ABC, NBC, and CBS. Created in 2006, The CW airs several original shows, and most of them follow a fantasy, supernatural, or fictional story line. Most of their prime time original shows fall under a fictional drama genre, with the exception of some reality TV. The content of the CW's current programming was analyzed and their ratings were recorded. Motives for the current audience, which is mainly females from 18-34, were studied and the agenda of the channel and all of its programming was also researched. There is a general trend in which the CW's agenda follows, and this presentation will discuss the main themes that are displayed throughout programming, and the messages that are to be portrayed within them.

375 FX - "Fearless"

Lance Nave, Rebekah Tedde

The purpose of this study was to analyze the media channel, FX. Specific factors that were looked at included the corporate parent(s), the types of programming that the channel offers, who their targeted audience is, as well as their ratings. In looking at the audience motives and agenda, research helped

identify why people use the media that is provided by the channel as well as the agenda that is provided within the content was also researched.

377 Exploring the Relationship Between Body Image and Self-Esteem in Male Athletes and Non-Athletes: A College-Aged Sample

Michael J. Leskosky, Dana Krieg

It has been suggested that over the past several decades, both men and women have been exposed to unrealistic and unobtainable ideal body images portrayed by the media that have become the norm in our society today; however, the vast majority of research has focused on the effects of these social constructs on females. Although there have been recent additions to the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5), including insight and muscle dysmorphia specifiers for body dysmorphic disorder, an inadequacy of published literature investigating body image and self-esteem in men still remains. Thus, this area of research is thriving for an expansion of empirical evidence. The present study is aimed to examine the relationship between various body image constructs and self-esteem between 196 college-aged male athletes and non-athletes. Participants were administered a comprehensive battery of measures that were posted to an online data collection site. Findings suggest that athletic participation is associated with a higher degree of body-esteem based on appearance evaluation, less appearance anxiety, and a greater likelihood to engage in the use of performance enhancing substances (PES) or steroids, whereas non-athletes interestingly exhibited an elevated drive for muscularity (DM). There were no significant differences found regarding self-esteem.

378 Scanning Electron Microscopy (SEM) Investigation of Alumina Ceramic Coatings on FeCrAl Foils

Matthew Lehman

Alumina (Al₂O₃) ceramic coatings on FeCrAl alloy substrates prepared in different conditions were analyzed using scanning electron microscopy (SEM) techniques. The investigation was performed in order to determine the integrity, morphology and relative thickness of the coatings, as well as the chemical composition change across the ceramic-metal interface. Integration of the coating into the substrate would indicate a robust attachment of the coating to the substrate. The investigation methods included SEM imaging using secondary electron and backscattered electron detectors, and chemical composition investigations using X-ray energy dispersive spectroscopy (XEDS). Sample cross-sectioning was performed using metallographic and focused ion beam (FIB) methods. Experimental data analysis indicates uniform coating of the substrate. The coating thickness varies from one sample to another and seems to be related with the coating deposition process parameters. The measured values for the coating thickness were between 20 micrometer and 100 micrometer. The analysis revealed that the ceramic coating film is porous. A homogeneous buffer layer (about 100 nanometer thick) between the ceramic coating and the substrate was observed in one sample.

380 Are Athletes Victimized by Teachers/Administrators or are they the cause of their own Victimization?

Torrian Pace

There is no secret that there are athletes that get pushed along through high school and even in college. A handful of teachers and administrators cheat some of these student-athletes by falsifying their grades and student records because of their talents so that they are able to play their respected sport on the collegiate level. This epidemic carries over to universities who want to bring money to their sports programs. This study seeks to answer the questions; Are athletes being victimized by teachers/administrators or are they the cause of their own victimization? My proposed methodology in approaching this study is to find academic articles and survey and interview student athletes and NCAA compliance administrators. This would serve as a base line for future self-administered surveys. The expected results are that teachers/administrators and student-athletes share equal cause in the victimization. This research would be useful to show a form of victimization that society accepts.

381 Russia,Ukraine, Crimean Incident : A Report on the History of the Conflict

Jeffrey M. Bash, Catherine Cooper, Lucas Obrenski, Michael Hernandez

Annex; the definition is to incorporate (territory) into the domain of a city, country, or state. Germany annexed part of Czechoslovakia during 1939. As a result of aggressive annexing, the Second World War started during 1940's. Today, Russia has annexed Crimea from the Ukraine. These actions have sparked the interests of the world community. Ukraine is a country in Eastern Europe that borders Russia to the east and northeast. At the beginning of the 20th century, Ukraine was a consolidation of the Soviet Republic which eventually became an independent state during 1991. Since then, the Ukraine has faced great destabilization as a result of ongoing social strife and unrest. The Crimean Peninsula is on the north coast of the Black Sea located in the southern part of the Ukraine. As of March 18th, 2014, the Crimean Peninsula seceded from the Ukraine and joined Russia. There is ongoing research behind the annex of the Crimean Peninsula and its implications.

383 Comparison of the small volume nebulizer to the Aerogen Solo nebulizer for the growth of infectious microorganisms

Robert Prestia

The purpose of this study was to investigate the growth of infectious organisms, specifically Staphylococcus species and Pseudomonas aeruginosa, on the small volume nebulizer, Hudson RCI Micro-Mist Nebulizer compared to the Aerogen Solo nebulizer. The types of growth were explored through a bench study demonstrated in the respiratory care lab. Current respiratory students were presented with a task to complete nebulizer treatments on both devices. A mock scenario was given to represent intensive care patients whom were intubated, receiving mechanical ventilation through the Puritan Bennett 840 ventilator and requiring medicated aerosol therapy inline. The prevalence and types of infectious organisms were explored. One hypothesis was tested: the small volume nebulizer will grow significantly more microorganisms than the Aeroneb Solo nebulizer due to its equipment structure/handling. Informed consent was obtained. Methods: Each nebulizer was swabbed with a sterile swab moistened with sterile saline over the course of 4 days. Mannitol Salt Agar (MSA) was streaked for isolation of Staphylococcus species and MacConkey Agar (MAC) was streaked for isolation of gram-negative bacilli, Pseudomonas aeruginosa in particular. Plates were incubated at 35 C and observed for growth at 24 hours and 48 hours incubation. Results: Analysis indicates a growth of coagulase negative staph and other contaminants on the small volume Hudson nebulizer that proves the hypothesis was correct. Cultures are still growing at this time. Conclusion: Nosocomial infections are prevalent within the healthcare setting today. Often times the sources of these infections are hard to identify.

385 The effects of a constructed wetland to mitigate cultural eutrophication in an agricultural environment

Jessica Bowles, Johnna Zona

Cultural eutrophication can lead to nutrient overload, causing algal blooms and resulting in aquatic habitats not suitable for fish or other important organisms. This study evaluated the effectiveness of a constructed wetland in Columbiana County, Ohio due to agricultural runoff from near-by farms. Sampling was conducted five times throughout the year and water samples were taken from the Inlet, wetland, shallow, and deep parts of the pond. Analyses performed included five day BOD, phosphorus, total dissolved oxygen, total dissolved solids, and total suspended solids. At the site, using a Dissolved Oxygen Meter, the dissolved oxygen and temperature was read at different depths of the pond. the objective of the research was to see if the man-made wetland cells were able to absorb some of the nutrients from the runoff before it reached the pond. Another objective was to see if a man-made waterfall and circulation system would increase the dissolved oxygen to make the pond viable for fish and other aquatic life. The results suggest that the waterfall and the circulation system increased the dissolved oxygen in the pond significantly. The wetland cells showed some improvement with the nutrient load in

the pond compared to the previous years when there was no wetland cell. However, there was not a large enough impact to keep algal blooms from happening. More samples and testing should be run for a couple of years to see if there is a steady improvement in the water quality of the pond including a reduction of algal blooms.

386 Neonatal Sepsis

Laurie McGlynn

Neonatal sepsis is a serious blood infection that can occur within the first 90 days of life. It is important to know the signs and symptoms of infections as well as how to treat the neonate when they present for medical care. It has been researched and proven that starting antibiotics in neonates younger than four weeks before the labs come back drastically increases the survival rate and improves the outcome for the patient (National Institutes of Health, 2014). It can be hypothesized that by educating health care providers about neonatal sepsis can improve the outcome of patient care. The study would be an experimental design including adult ER nurses. The sample would include random neonatal patients who presented to the ER. The instrument would include a pre and post-test assessing neonatal sepsis knowledge. The setting would be an adult ER in the tri-county area. Once the pre and post-tests are completed the information gained would then be evaluated in SPSS. Minimal risk would be maintained along with keeping all information confidential. The benefits would include improving the adult ER nurses knowledge of neonatal sepsis and the benefits of early identification and treatment.

387 Treating the comorbid diagnosis of eating disorders and social anxiety: A group therapy approach

Ally Zins

Social anxiety and eating disorders have a high rate of comorbidity; yet, there are no current treatment programs to address both simultaneously. This study addresses the development of a group therapy treatment program to address both disorders. Thirty females from The Ohio State University with social anxiety and either anorexia, bulimia, or both, will voluntarily take part in the study. Participants will be split into a treatment and control group. The treatment group will receive 20 weeks of group therapy based on cognitive-behavioral methods, and the control group will receive 20 weeks of general counseling not specific to their eating disorder or social anxiety. The Eating Disorders Inventory-2, Social Phobia and Anxiety Inventory, body mass index scores, and self-report measures of inappropriate compensatory behaviors will be administered before and after treatment. Differences in pretest and posttest scores will be compared between the treatment and control group to test the hypotheses that the treatment program will reduce social anxiety based on the Social Phobia and Anxiety Inventory and reduce anorexia and bulimia symptomatology based on the Eating Disorders Inventory-2, body mass index scores, and frequency of inappropriate compensatory behaviors. It is expected that there will be a significant difference between pre- and post-treatment scores between the groups.

389 Sexual Health Education

Monique Malmer

Sexual health education is a major public health challenge. There are decreasing school and community sexual health programs due to lack of funds. National health care costs for the treatment of sexually transmitted diseases (STD's) continue to rise annually. The population at highest risk for STD's are adolescent children ages 15-24 (CDC, 2012). Education adolescents can be challenging due to the embarrassing subject matter. It is hypothesized that sexual health knowledge can be increased with a computerized program developed for adolescent children. The study design would be an experimental design with a quasi-convenient sample of eight grade middle school adolescent children. The sample would include northeastern Ohio public schools with the exclusion of special need students. The instrument would include a pre and post-test assessing sexual health knowledge. The pre-test and post-test developed by the researcher will be used as a measurement tool in this study. The computerized program would be provided to students after the pre-test. The post-test would be given at the completion

of the computerized program. The setting would be the school system and the testing would be conducted during class time and proctored by myself. The recruitment process would involve IRB and school board approval. A letter explaining the content along with a consent form would be sent home to the parents. Once the pre and post-test are completed, statistics would be evaluated utilizing SPSS descriptive and reliability co-efficiency tests. Validity would be determined with future use. Minimal risk would be maintained along with keeping all information confidential.

394 Examination of Possible "Salty Fingers" in Diffusion of Cobalt Nitrate

Michael Baker, Connor Hetzel, Michael Kunzer, Ian Schantz

In this presentation, the diffusion of cobalt nitrate (CoNO₃) is observed and measured using light-emitting diodes and photodetectors. This process leads to several "ripples" appearing in graphs of the diffusion. A random-walk model of this diffusion is implemented in order to attempt to understand these "ripples", which may fit the description of characteristics in diffusion curves labeled "Salty Fingers".

395 Competitive anxiety and the effect of relaxation methods

Carolyn Jesko

Research has shown that relaxation methods have improved athletic performance when athletes have reported to be anxious (Fletcher & Hanton, 2001; Sunaina et al., 2006; Dunn & Dishman, 2005). Two different forms of methods have been studied: psychological and physiological. Psychological techniques include mental imagery, positive self-talk, and goal-setting. Physiological methods include deep breathing and progressive muscle relaxation. This study aims to look at differences in the effectiveness of two relaxation methods, mental imagery and progressive muscle relaxation, used to reduce anxiety. Each participant (male and female intramural volleyball players) is trained in a particular relaxation method. We then induce anxiety using a mental math task and examine the behavioral and physiological measures of effectiveness. We measure the accurate number of serves, as well as physiological changes (skin conductance, skin temperature, and heart rate) that take place while anxiety is induced and while utilizing the trained relaxation method. We compare whether there is a particular technique that will work better in general for all participants, or for a specific gender. Research has suggested taking gender into consideration as well (Dunn & Dishman, 2005). We hypothesize that the psychological relaxation is more likely to work better.

396 The Different Dimensions of Disney

Richard Donadee

This study will examine the Disney Company's evolution from the humble beginnings with Walt Disney at Laugh-O-Grams studio into the global media powerhouse that it is today. The Disney Company has survived for over 90 years thanks to the company's ability to adapt to innovative animation techniques, advances in technology, and shifts in market trends. However, the Disney of today may not be the same company that many Americans fondly remember under the direction of Walt. In 1984, Disney underwent a drastic change in core ideology after Michael Eisner became the CEO. The company no longer operated for the purpose of providing entertainment, instead they were driven by profit. The discrepancies between the Walt Disney Company's carefully crafted public image as a wholesome family company and the actual corporate business practices have caused both positive and negative receptions of the company in today's academic circles.

398 Millennial Attitudes on Evolution

Kathryn Robison

This project uses data from the most recent General Social Survey to compare opinions among the Millennial Generation on the subject of evolution. It will examine if factors such as religious affiliation and

education level have a significant impact on whether or not Millennials accept of the theory of evolution as scientifically valid. Though it will not be significantly addressed in this project, it will also investigate connections between political affiliation and belief in evolution.

399 Three Views of Y.S.U.'s Supportive Campus Environment

Margaret Gratz-Reynolds

Student engagement on university campuses is critical in the student's higher education experiences as well as an important factor when looking at graduation and retention statistics. According to the YSU's National Survey of Student Engagement, (2013), "YSU freshmen reported lower levels of ... supportive campus environments relative to our peer institutions.' Student engagement is the single best predictor of student success in college, and this data will provide valuable insight to YSU on where we are best meeting students' needs as well as where we can improve." In 2010, to examine YSU's support services, data was collected that showed the ratios of students served to faculty and staff members in numerous units across YSU Campus. Recently, local, state, and national comparative retention data was analyzed and the results were informative. This poster presentation will look at all three sets of data concluding with the retention rates of students passing Reading and Study Skills courses to show the success of this campus service.

400 Design of a Vertical Axis Wind Turbine

Marcus Nittoli, Raymond Gladych, Randy Caskey, Steve German

The purpose of this design and study was to create a vertical axis wind turbine located in Hawaii that fulfilled a specified power requirement. The wind turbine was sized based on data collected from known wind farms and known data from the chosen site. Based on the research data, the blades of a private turbine outputting approximately 10 KW had to have an operational range of 75-125 revolutions per minute. The desired average rotational rate was chosen to be 100 revolutions per minute, and this was the rotational rate for which the power output was specified.

This work focused on the support structure and airfoils. The analysis approach was based on stress analysis and mass transfer energy extracted from the environmentally available wind energy. The stress analysis was used for the design of bearings applied to the vertical rotational shaft of the airfoil. The energy analysis predicted the size of airfoil required for use in Hawaii.

402 Determining Static and Dynamic Coefficient of Friction

Michael Kaldy, Ryan White, Matt English, A. J. Grayson

Coefficient of friction is very important in many engineering applications. The purpose of this project was to design and assemble an apparatus to test the static and dynamic coefficient of friction of various materials. Any application where there is a material interface depends on coefficients of friction in some respect, including Delphi processes. The resulting machine can test any solid materials with available samples.

403 Credibility and Gender in Relation to Tattoos

Kaitlyn Humphrey

Visible tattoos on males and females have become more frequent. Studies show that tattoos negatively affect perceptions of individuals in the workforce. The current research will determine if a male's or female's credibility is affected by the visibility of tattoos. First, a survey of fifty statements was rated for credibility and only those statements scoring at the 50% percentile for credibility will be used in the second phase of the study. During the second phase, participants will view a male or female making the statements, either with or without visible tattoos. Participants will rate the individual's credibility by agreeing or disagreeing with the statements, and report how confident they are with their answer. We

hypothesize that the participants viewing an individual with visible tattoos will rate the statements as less credible, and that the female with tattoos will be rated as the least credible.

405 Predicting Healthy Lifestyle Success in the College Environment using the Transtheoretical Model

Lauren Kocher

Background: Overweight and obesity has affected over two-thirds of the population in the United States. Adults are most likely to adapt life-long health habits between the ages of 18-29, confirming the need for research among this age group. Research was conducted in a college environment to examine strategies of planning health interventions to better target and promote healthy lifestyles. More knowledge in this area can help equip students with healthy habits for the rest of their lives, which help decrease overweight and obesity rates among the greater population.

Objective: The purpose of this study is to investigate if a correlation exists between the Transtheoretical Model Stages of Change and the self-reported frequencies of healthy eating and exercise among a college student sample. Hypotheses: Participants that are in more advanced stages of readiness to change according to the Transtheoretical Model will state that they follow healthy eating/exercise habits more often which can enable them to achieve more personal goal success. If the hypotheses are found correct, results may contribute to strategies for developing health interventions in the college environment.

Methods: A health-related survey was administered to college students to obtain preferred methods of healthy eating and exercise, the frequency in which they are practiced, and their self-determined stage in the Transtheoretical Model in regards to a personal health goal. Six hundred twenty-four students responded. Data will be analyzed using SPSS and Ordinal Logistic Regression. The independent variables of stage of change, gender, education, and living situation, are compared with frequency of healthy eating and exercise methods in the college environment. Statistical significance was found among the results, which are still in the analysis stage.

Results and Conclusion: yet to be determined at this time.

406 Youngstown State University Herbarium: Its History and Modern Use

Cory B. Powell, Timothy D. Shives, Heidi J. Hall, Nicholas P. Karousis, Brandon T. Sinn

Herbaria are located on university campuses across the United States housing biological records of thousands of plant specimens. Ohio currently has more than 35 herbaria throughout the state, and Youngstown State University maintains the fourth largest herbarium to date. Youngstown State University's herbarium contains not only specimens from Ohio and the United States but from many different countries around the world. The vast collection that is contained in the university's herbarium is credited to Professor Carl F. Chuey whom has provided more than 52,000 specimens. The focus of this study is the modern use of herbaria, and how collections can provide vital data for the documentation of changes in the environment, and historical records for many investigations of science.

407 Predicting Eastern Bluebird reproductive success using local and landscape variables: a GIS approach

Amanda L. Ruozzo

Non-indigenous species are widely reported to compromise the population growth of native species but quantitative estimates of this phenomenon are often lacking. As such, management recommendations are frequently rooted in subjective speculation than in science and thus have poor predictive power. The House Sparrow (HOSP) was introduced into New York, NY from Europe in 1848 and has since increased its range to encompass North America, where it usurps nests of native cavity-nesting birds, frequently killing eggs, nestlings and adults in the process. Here, we propose to use local and landscape variables to estimate the reproductive success of the Eastern Bluebird (EABL), a native species which has numerous societies that manage its population via artificial nest box placement and maintenance. Factors reportedly contributing to EABL reproductive success include distance from building, particularly

those offering a stable food source (a proxy for HOSP abundance), distance from treelines, and paired vs. unpaired nest boxes. Our approach couples geographic information systems (GIS) with reproduction data from the more than 1500 nest boxes we currently possess to develop a robust, multi-scale predictive model of EABL nesting success across a heterogeneous landscape. We also propose the utility of this model can be extended to numerous species of conservation concern.