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The Eleventh Edition of the

Research &
Creative Works
Conference

Fall 2012 Semester
Thursday, December 6th 2012

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Functional Design and Sustainability of Rope Beds for the Prevention of Chagas Disease in La Abundancia, Paraguay

Julie Brandao, Susannah Scheuermann, Amy Frisby, Amanda Hernandez, Teerah Lopez, Tysen Davis, Tyler Watson (Mentor)

Introduction: Chagas disease is endemic in South America, with the small community of La Abundancia in Northwest Paraguay gradually developing and the population growing the need for a solution to the spread of this disease is a priority for officials and the community. One viable solution is to provide the community with raised beds in order to keep them off of the ground and away from the insects which serve as a vector for this disease. The design of this project is intended to accomplish the development, construction and supplementation of a functional, sustainable and sound bed to be supplied to the community. Methods: Constructing a pioneer type “rope bed” seemed to be the most logical with the availability of supplies and the intended population that the final constructions will be serving. Modern western bed designs are often very heavy and intricate in construction, a framework which does not fit into the parameters of the project. Materials for the frame and “rope” (suspension portion of the beds) were discussed. The ropes were constructed by braiding plastic bags together. Prototypes testing various structural designs of frames and weaving techniques were constructed. For each prototype several key aspects were considered and included; simplicity of design, structural soundness, “reparability” of various working aspects (joints, ropes, rope fasteners and etc.). After choosing a final design that best met all of the aforementioned requirements a half size to-scale model was constructed and tested. Intended Results: The goal of this project is to construct a bed that can be implemented into the population of La Abundancia. The final model should be sustainable, simple in construction, functional in consideration to both space and capacity and adaptable to a changing environment. A final full size six by six foot rope bed will be constructed taking the half scale model’s weaknesses into consideration. This finalized bed will best fit the needs of the intended population while maintaining its portability and ease of assembly.
Raising rabbits as an approach to decrease protein deficiency in developing countries

Kelly Morrison, Justin Jones, Sara Bowen, Carmelita Sando, Jackie Hardy, Ryan Blair, Darwin King
(Mentor)

Protein deficiency and the associated health problems are still a worldwide plague in developing countries. Today more than one third of children are affected by protein deficiency. Raising rabbits has proved to be more cost effective, less time consuming and produce greater protein yields than the more commonly used cows, goats, pigs, sheep and poultry. The resource commitment required for rabbits is significantly less than raising other animals. Feeding rabbits does not take away from human food resources, because rabbits do not require a grain specific diet, and consume unused plant matter. Rabbits were raised according to the Federal USDA animal care standards. The project began with two adult does, one adult buck and four kits. Daily measurements of food and water were taken for the rabbits, and weight gains were recorded weekly for the kits after weaning. Following the removal of the kits the doe was bred with the buck and her feed intake was recorded. This reflects the maintenance expense required for the adult rabbits. Rabbits were always fed before 5:00 pm to ensure consistency. From the time the kits were born they were fed a commercial alfalfa pellet AD Lib. This allowed them to gain weight without restriction. In the first two weeks from weaning they gained an average of 0.73 pounds per week. The three weeks following they gained an average of 0.60 pounds per week. The average final harvest weight at eleven weeks was 4.93 pounds. The four rabbits produced 10.58 pounds of meat. 68.44 pounds of feed were consumed, equating to 6.47 pounds of feed per pound of harvest weight. The project is still monitoring the gains of another rabbit breed. The second doe’s litter is in their first week of weaning. Their data will contribute to the applicability of our project. There are plans to implement this project in Nigeria, Liberia and Paraguay.

Comparison of Alfalfa Yields Under Different Irrigation Rates in Southeast Idaho

Eric Larsen, Greg Blaser (Mentor)

Recent drought and reduced irrigation water allotments may reduce alfalfa yields and quality. Alfalfa requires 50-100% available moisture at all times, 50% being the permanent wilting point, and 100% being field capacity. Alfalfa requires approximately 14.5 cm of water to produce 1 Mg of alfalfa biomass. The study examined the effect of different irrigation rates on alfalfa yields in southeast Idaho to determine the minimal amount of irrigation to maintain optimum yields. Alfalfa was planted in 2009, but data were collected in 2010-2012 after the alfalfa was established. Irrigation rates were based on evapotranspiration rate (ET), and irrigation was applied when ET rate reached a threshold of 5 cm at a 90 cm root depth. Before irrigation, soil samples were taken in 15 cm increments to a depth of 90 cm for measuring gravimetric and volumetric. Gravimetric soil moisture was determined as the difference of wet soil weight and 24 hr dried weight, and volumetric weight was calculated by multiplying gravimetric soil moisture by multiplying 1.35 g cm\(^{-1}\) (the bulk density of our silt loam soil). Alfalfa stand counts were measured in the spring of each year. Lower irrigation rates have resulted in lower alfalfa yields at different times of the year.
**Effect of Chronic Ankle Instability on Ankle Fatigue Rates**

Austin Whiting, Korbin Keller, Mark Coglianese (Mentor)

The purpose of this study is to study fatigue rates in chronic ankle instability and healthy (no history of ankle injury) subjects. This study is important because it expands the current understanding on the relationship between fatigue and injury. These results may also help improve ankle rehabilitation protocols for those who sustain ankle sprains. In this study the fatigue times of the Peroneus Longus and the Tibialis Anterior muscles were measured. We first had the subject warm up by walking at a self-selected pace for 2 minutes. The subject then performed 2 maximal isometric contractions, using a dynamometer, for both of the muscles. They performed dorsi flexion for the Tibialis Anterior and eversion for the Peroneus Longus. After maximal isometric testing, the subject held a neutral ankle position at 75% of their maximum isometric force for both of the muscles tested. The subject was only required hold this position 3 times with 5 minute rest intervals. The results of the 3 different sets were averaged together. Finally, the participant performed 3 repetitions of a single-leg stance for 60 seconds each. Verbal encouragement was also given periodically throughout the study. Those who had CAI had lower maximal isometric contraction strength, but were able to hold their 75% max contraction considerably longer than the healthy subjects. This may have been because of the strength gap between the two groups which shows that a decrease in maximum strength of a muscle leads to an increased ability to hold a contraction for longer periods of time.

**Chagas Disease**

Terra Horst, Charise Fekete, Christina Westover, Britt Orgill, Yuki Hayashi, Tyler Watson (Mentor)

The Nivacle Indians live in a small village in Paraguay, the community consists of approximately fifty families. Their homes currently have sturdy roves, but are lacking enclosed walls. The parasitical disease, Chagas, has heavily impacted the Nivacle community. Chagas is transmitted by the triatomine, or kissing bug. These bugs often hide in crevices and are very active at night when they come out and feed. A bite from a kissing bug transmits the disease to the individual, which consists of two stages, the acute stage and the chronic stage. The acute symptoms include: fever, rash, body ache, loss of appetite, vomiting and diarrhea. The later and more serious stage of the disease may result in heart and intestinal complications. In order to prevent this disease, we created an educational program to inform adults about vector control, and pesticide use. We also created coloring books, informative posters and planned activities to educate the children about the disease and the kissing bug.

**Larval Behavior of the St. Anthony Dune Tiger Beetle (Cicindela arenicola) in the St. Anthony Sand Dune System**

Shiloh Judd, Gavin Martin, Christopher Wynn, Daniel Clark, John Zenger (Mentor)

The St. Anthony Dune Tiger Beetle, Cicindela arenicola Rumpf, is found only in the dune systems of southern Idaho and southern Montana, with the largest population located at the St. Anthony dune system in southeastern Idaho. While larvae are present year round in their underground burrows, adults and larvae are generally only active and visible from April through June, and again in September and October. While gathering population density data for the Bureau of Land Management regarding these beetles, a peculiar variability in behavior was noted in the larval stages. Populations in soft-sand habitats exhibited either nocturnal or diurnal hunting behaviors, depending on the season, while populations in hard-packed sand habitats remained active throughout a 24 hr. period irrespective of the season. Current research is devoted to learning why there is a difference in larval behavior within the same species, or if we are indeed dealing with two distinct species currently undetectable in the adults.
Plant Density and Equidistant Spacing Effects On Tuber Yield and Tuber Size in Red Norland Potatoes

Daniel Jamison, Jared Williams (Mentor)

Plant Density and Equidistant Spacing Effects On Tuber Yield and Tuber Size in Red Norland Potatoes. Student Presenter: Daniel Jamison Faculty: Blake Willis and Jared Williams Standard planting of potatoes has been between row spacing of 91 cm and plant spacing of 23 cm within rows. This traditional spacing practice can be improved upon, as it does not provide the best conditions for higher yields, higher amounts produced and a smaller, more desirable tuber size. This experiment is being conducted to discern how plant spacing influences the yield, amount and size of tubers produced. Three blocks were created to conduct this experiment, each block consisting of five plots (9 m²). The equidistant arrangements tested were 18 cm by 23 cm, 25 cm by 30.5 cm, 33 cm by 38, and 38 cm by 45.5 cm. The traditional 91 cm row spacing was used as a constant. The treatments were randomized and tested once in each block. The potatoes were hand planted and the plots were sprayed pre-emergently with the herbicides Sencor, Eptam and Matrix. In previous experiments yield was higher with closer plant spacing. Data collected in 2008 and 2009 shows that yields came in at 26 and 65 Mg/ha⁻¹ for the control and 51 and 75 Mg/ha⁻¹ for the 18 cm by 23 cm equidistant spacing. The amount of tubers was also higher at closer plant spacing with 4X10⁵ tubers produced in 2008 and 2009 for the control and 8.8X10⁵ tubers produced in 2008 and 12X10⁵ tubers produced in 2009 for the 18 cm by 23 cm equidistant spacing. When looking at tuber size among the different equidistant spacings and control, the 18 cm by 23 cm spacing had the smallest, mean tuber size at 51 g. All in all, based on previous experiments higher yields, amounts and smaller tuber sizes are expected as plant spacing decreases for this experiment.
Comparing MAP and 40-Rock Fertilizer for Phosphorus, Sulfur, and Zinc Uptake in Corn

Comparing MAP and 40-Rock Fertilizer For Phosphorus, Sulfur, and Zinc Uptake in Corn  Student Presenter: Brock Leonard (not present) Faculty: Jared Williams Phosphorus (P) fertilizer use efficiency in southeast Idaho soil is low because P reacts with calcium and precipitates as a non-plant available secondary mineral (P fixation). Simplot Company has developed a polymer (Avail) that is applied to the fertilizer granule to reduce P precipitation. This study will compare plant uptake of P using mon-ammonium phosphate (MAP) treated with and without Avail as well as 40 rock fertilizer treated with and without avail. The study will be conducted in the greenhouse with a low P soil collected from the BYU-Idaho farm. The experimental design is a randomized block design with four corn plants per pot. Fertilizer treatments will be 28, 56, 83, 112 kg ha-1 for each fertilizer (MAP and MAP+Avail). Plant biomass will be estimated by measuring plant height every week following emergence. Plants will be harvested at the V4 growth stage, dried, and grinded for P, Zn, and S amounts. It is anticipated that corn receiving the MAP+Avail will have higher P, Zn, and S amounts, because Avail will have reduced P fixation.

Effect of Nitrogen Fertilizer On Nodulation, Yield, and Quality of Alfalfa

Alfalfa producer traditionally have used fertilizer that contained only phosphorus (P) such as triple super phosphate (TSP), but the cost of TSP is greater than other P fertilizers such as monoammonium phosphate (MAP). Some producers are concerned that using P fertilizers that contain some nitrogen (N) could delay or reduce rhizobia nodulation. The objective of this study is to determine how nitrogen (N) and phosphorus (P) fertilizers affect root development, nodulation of rhizobia, yield, and feed quality of alfalfa (Medicago sativa). Healthy root development and nodulation is essential for alfalfa to obtain sufficient N for optimal yields and quality. The objective of this study is to quantify the affect of N and P fertilizer on the quantity of nodules per plant, the density of nodulation, and forage yield and quality. Soil samples were taken in the spring of 2012 to determine initial fertility levels. Fertilizer was applied pre-plant and treatments were a control, 112 kg P ha-1 only, 22 kg N ha-1 only, 44 kg N ha-1 only, and 5 treatments with 112 kg P and 11, 22, 33, 56, 82 kg N ha-1. Roots for nodule counts were obtained by removing plants from a 12 inch strip randomly within the plot area and counting the nodules on the roots. Nodule samples were taken at 4, 6, and 10 wks after planting. Alfalfa was harvested at pre-bloom stage by cutting 5 ft swath 20 ft long and avoiding nodule sampling areas. Initially analysis of nodules counts showed no differences among treatments at 4 and 6 wks after planting. These results suggest the fertilizer has no affect on nodulation during the initial months of alfalfa growth. The study is ongoing, and week 10 nodule counts, yield, and forage quality have yet to be measured. The study is in the first year of a four-year study to examine the long-term affect of N fertilization on alfalfa nodulation, yield, and forage quality.

Effect of Caffeine on β-galactosidase Activity

David Perry, Laira Sitchon, Steven Christenson (Mentor)  It is well known many molecules in low concentration can have great effect on the body and on its normal processes. In the activity of many enzymes, for instance, a small change in their concentration or activity can have major consequences on the body’s homeostasis. It is the purpose of this project to quantify what effect, if any, the presence of caffeine has on the activity of the enzyme β-galactosidase. Activity of the enzyme can be measured by monitoring a change in absorbance pattern over time compared to a control assay done in the absence of caffeine. Any correlation will open the doors to an understanding of how caffeine consumption yields the physiological effects it does.
Enzyme Kinetics

Erika Dunn, Courtney Albert, Steven Christenson (Mentor)

The purpose of this study was to determine the effects that various substrate concentrations and inhibitors have on reaction rates. In this experiment, Phosphatase (enzyme) was added to our solution, and the rate at which the reaction occurred was measured. The total reaction rate is determined by the rate at which the enzyme binds to the substrate (p-Nitrophenol) followed by the rate at which the substrate-enzyme complex is broken down into the product. For all reactions, enzyme rates were also measured with and without the presence of an inhibitor. From data collected, it was determined that inhibitors slow the enzyme catalyzed reaction rate of the substrate. It was also determined that the rate of the reaction occurred more quickly with lower concentration of...

Lactase Assay

Meagan Pittman, Lindsay Adams

This experiment involves taking a discontinuous kinetic assay of multiple over the counter enzyme lactase pills to find out which pill has the best affect on those individuals with lactase-intolerance. Lactase is hydrolyzed to its corresponding monosaccharides by the enzyme Lactase in the body. O-nitrophenyl-beta-D galactose will be used because when lactase is hydrolyzed, galactose is yielded along with o-nitrophenol. This compound has an absorbance of 450 nm which we can use to calculate enzyme activity and evaluate the lactase in our tablets.

Genotyping on Mini-gels

Kelsey Hirschi, Logan Pfeiffer, Steven Christenson (Mentor)

Genotyping is the process of creating a unique genetic ‘fingerprint’ of an individual which can then be used to identify the individual from the population. Currently, genotyping is the subject of a lab activity in the Biochemistry and Molecular Biology (Bio377) class at BYU-Idaho. However, practical application of genotyping has been limited because the separation and analysis of a genotyping locus require a single polyacrylamide gel that measures approximately 30 cm X 60 cm. This large gel takes eight hours to prepare and must be created by an instructor prior to use by the class. In another Bio 377 lab, mini-gels measuring 8 cm X 8 cm are used to separate and analyze proteins. This smaller gel format can be prepared by students and completed during a three-hour lab time. The proposed objective of this study was to determine if genotyping of a single locus could be carried out on a mini-gel. Genomic DNA was collected from students and two loci, D7S820 and D8S1179, were amplified through polymerase chain reaction (PCR). The resulting PCR product was used to conduct gel electrophoresis on four mini-gels with varying compositions: MetaPhor® agarose gels at 3% and 4%, and polyacrylamide gels at 10% and 12%. The four gels were compared to see if complete allele resolution was possible and to determine which gel produced the best resolution.

Sodium Azide Inhibitor effects on Horseradish Peroxidase

Logan Best, George Speer, Steven Christenson (Mentor)

This project identifies the competitive inhibiting effect of varying concentrations of sodium azide on horseradish peroxidase. Varying concentrations of Tetramethylbenzidine (TMB) substrate were used with varying concentrations of sodium azide in a continuous assay to create a Michaelis-Menten and Lineweaver-Burke plots identifying the velocity and rate of substrate binding with and without inhibitors. It was found that sodium azide is an inhibitor, and identified the percentage of inhibition at which specific concentrations of inhibitor are present.
Comparing Chlorophyll Meter Readings to Petiole Nitrate for N Management in Potatoes

Gregory Bean, Jared Williams (Mentor)

The need to determine adequate nitrogen (N) levels for potato crops during the growing season has required expensive and labor intensive petiole sample testing. The use of a SPAD Minolta chlorophyll meter by potato producers could reduce sampling costs and time while providing accurate in-season potato petiole N levels. The objective of this study was to compare the SPAD chlorophyll meter and petiole samples for accuracy in measuring N petiole levels for in-season N fertilization for potato crops. Nitrogen treatments of 0, 56, 112, 168, 224, and 280 N kg ha\(^{-1}\) with three to four replications in a randomized complete block design were used to establish different N levels in the potato crop. Fertilizer was split applied with 56 kg N ha\(^{-1}\) at planting and during June and July. Petiole NO\(_3\) samples, chlorophyll meter readings, and soil NO\(_3\) test were taken weekly for 8 weeks beginning in July through mid-August. Chlorophyll meter readings were compared to petiole NO\(_3\) and soil NO\(_3\) levels. Potato plots were harvested by digging 3 meters of two adjacent rows and yields were determined based on total weight. Yield data was compared with petiole NO\(_3\), chlorophyll meter data, and soil NO\(_3\) levels for determining which method best predicts yield. Correlation between SPAD meter and petiole showed that in order to meet the early season 20,000 mg kg\(^{-1}\) petiole NO\(_3\) threshold the chlorophyll meter reading must meet or exceed 47. For midseason, the petiole NO\(_3\) threshold drops to 15,000 mg kg\(^{-1}\) and the correlating chlorophyll reading is 41. The late season petiole NO\(_3\) threshold drops to 10,000 mg kg\(^{-1}\) the chlorophyll reading remains 41. The similar chlorophyll meter reading between the mid and late season petiole NO\(_3\) levels is due to the lack of new vegetative growth and a lower concentration need in the petioles. Yield data did not correlate to N application, petiole NO\(_3\), or chlorophyll meter readings probably due to large spatial variance and a large amount of residual N. Our data supports that chlorophyll meter readings accurately indicate N responsiveness of the crop 80-100% of the time when compared to petiole samples.
Improving the Success of Bacterial Transformation and Colony Selection.

Doug Brasier, David Smith

A major portion of the BIO 377 curriculum is devoted to learning how to be independent in the lab. It is easy enough to follow a step-by-step protocol that will help us achieve the correct results, but it requires so much more of us when we think critically on how we can improve upon already written experiments. The experiment “Heterologous Gene Transfer” is designed to help students clone the Green Fluorescent Protein by methods including PCR, agarose gel, and colony selection and isolation. One problem with the experiment is the timing of the different steps. There is a step in the protocol that requires selecting a colony off of the petri dish with a toothpick, and then putting it into an LB broth solution with ampicillin, and placing it in a shaking incubator for 16 - 20 hours at 37 degrees Celsius. This would normally take place by selecting a colony at 5 o’clock in the evening one day, and coming it at 9 o’clock the next morning to isolate it. We run into a logistic problem over the weekend when we need to isolate and the lab is closed. Our experiment is designed to alter the temperature of the incubator, as well as the time to incubate, to see if it is possible to let the sample incubate over the weekend without overgrowth occurring. We will run a control sample by incubating for the normal 16 hours, and we will then measure the pH and absorbance of our sample. We will run several variable samples including some grown at 32 and 27 degrees Celsius. We will then measure the pH and absorbance of those two samples at 16 hours as well as 48 hours, and compare the results to our control. If we see a comparable pH and absorbance of one of our variables to our control, we can conclude that leaving the sample in the incubator at a lower temperature for a longer time will not affect the results of the experiment.

Estradiol and Catecholestrogens affect Uterine Glycogen distribution by acting through conventional estradiol receptors.

Hailee Rogers, Garret Wasden, Jason Hunt (Mentor)

Glycogen is synthesized by the uterus in increasing amounts during proestrus-estrus in response to increasing levels of estradiol (E2) and then is subsequently mobilized to glucose during implantation despite relatively high levels of E2. We believe this dual effect of E2 on glycogen metabolism might be solved by a study of the effects of catecholestrogens (CE). Hydroxylation of E2 results in the formation of 4-hydroxycatecholestradiol (4OHE2) or the 2-hydroxylated form (2OHE2). CE’s interact with conventional E2-receptors, but may also act through distinctly separate signaling pathways. To pharmacologically determine if CE’s act in whole or in part through the classical E2 receptor signaling pathway we make use of Acalbifene (ALC), a selective estrogen receptor antagonist. Our objectives were to determine the effects of E2, 4-OHE2 and 2-OHE2 with (+ ALC) and without (- ALC) on total uterine GLY concentrations, and GLY content of uterine endometrium, myometrium luminal epithelia and glandular epithelia.
### Effects of Ethanol on In Vitro Lactase Activity

Joshua Tartakoff, Jeff Bell, Steven Christenson (Mentor)

Digestion of dairy products is facilitated in the small intestine by a family of brush border enzymes called β-galactosidases. Lactase is the specific β-galactosidase enzyme that is best known for catabolism of lactose to the carbohydrate monomers galactose and glucose. Relatively recent concerns about alcohol intake and its effects on digestion motivated this study to examine influences on in vitro lactase activity. O-nitrophenyl-β-galactoside (ONPG) was chosen as the substrate because of its similar molecular structure to lactose. While similar in structure ONPG possesses the chromogenic properties necessary for quantifying tests that the natural carbohydrate lacks. Bradford protocol was employed to find lactase concentration from commercially produced Lactaid. Assays of substrate dilution sequences from 2.5 mM to 25 mM concentrations were used to create Michaelis-Menten and Lineweaver-Burke plots. These plots were used to examine the effects of enzyme activity with different ethanol concentrations corresponding to content levels in beer, wine and spirits. Conflicting in vivo studies have failed to conclude whether lactase activity is increased or decreased in the presence of ethanol. Based on the majority of literature available, we predict that the presence of ethanol in an in vitro environment will increase lactase activity. Results are still pending to confirm or reject this hypothesis.

### Design of a tissue culture system using neurally-differentiated PC12 cells from rat adrenal gland as a means to study the reactivation of latent herpes simplex virus type 1 infections

Shaun Reed, Danny Fife, Seth Ririe (Mentor)

The causes of herpes simplex virus type 1 (HSV-1) reactivation in the human host have remained unknown. The virus causes a latent infection in neurons that remains for the lifetime of its host. The virus re-emerges periodically to cause lesions on the lip commonly known as cold sores. The purpose of our study was to design a tissue culture system to better study the reactivation of latent HSV-1 infections. The host cells we used were PC-12 cells from rat adrenal gland, which, when treated with nerve growth factor (NGF), differentiated into axon-forming neural cells. A quiescent HSV-1 infection was established and viral gene expression was monitored. The PC12 cells were also cultured in a tri-chamber system in which the distal axons grow into a fluid environment separate from that of the cell body. The characterization of this cell line’s ability to establish a latent infection in a tri-chamber system could allow for further creative design of experiments to assess the reactivation of HSV-1 from signals initiated at the distal axons.

### CYP1B1 Location and Activity in Mink Uterine Tissue

Austen Weeks, Steven Christenson (Mentor), Jason Hunt (Mentor)

This experiment serves to demonstrate the amount of CYP1B1 enzyme activity that is present in a given amount of mink uterine tissue. Cytochrome P450 (Cyp) is a family of enzymes responsible for the oxidation of various substrates. CYP1B1 is a particular type of Cyp enzyme whose function is to produce 4-hydroxy catecholestradiol from the 17-beta estradiol (the prominent form of estrogen). Specifically, it is a monooxygenase. One place in which this enzyme is found is the endoplasmic reticulum of Neovison vison (American mink) uterus. Through the process of ultracentrifugation, microsomes containing CYP1B1 from homogenized uterine tissue can be isolated. This isolated product, when subject to a Promega P450-GloTM CYP1B1 Assay (glo assay), will produce light that is proportional to the amount of CYP1B1 activity. Since the presence alone of an enzyme does not establish whether or not it is active and functioning, this experiment provides a quantitative means to determine the level of CYP1B1 activity. Through microsomal isolation and glo assay, I determined that CYP1B1 activity in mink uterine tissue is 100 lumins/min/mg of tissue.
Technological Advances in Teaching Anatomy and Physiology

Randall Law, Rachel Young, Jason Shaw (Mentor)

In February of this year, biology instructor Jason Shaw expressed an ambition to develop constructive online technology for his anatomy and physiology students. He particularly wished to facilitate a complete overhaul of Bio 264 laboratory curriculum for both online and traditional sections. At the time these ambitions were expressed, Bio 264 laboratory materials consisted of a word document detailing all terms and structures required for memorization, an anatomy and physiology textbook, and an interactive cadaver dissection tool (cd) known as Anatomy and Physiology Revealed (APR). In the case of traditional sections, students were also provided with regular access to anatomical models. Various plans were debated and numerous prototypes constructed before a final design was settled upon. This final design consisted of a state of the art online lab manual and an accompanying flashcard program offering students a method of convenient review. The lab manual’s efficient design offers students the opportunity to easily view up to six different images of specific anatomical structures and substructures minus the hassle of flipping pages in a textbook. Additionally, only structures required for memorization are listed, rendering the former word document unnecessary while overcoming a frustrating aspect of APR. Moreover, the lab manual’s online design enables it to run much faster and more smoothly than APR without the $35 per student price tag. Cross-platform compatibility is a tremendous upside to this new technology. Former technology was restricted to devices with an optical disc drive, whereas new technology allows students to study anatomy using tablets and smart phones. In conjunction with this lab manual, an online flashcard program was also developed to offer students an invaluable way to study while accurately accessing their progress. Intelligent programming allows students to save cards they are struggling with and view only those cards in a separate deck at any time. Versatile design enables flashcard decks to contain text, pictures, animations, or a combination of these resources.

The Effects of Estradiol-17beta (E2) on Insulin Receptor and Glycogen mobilization.

Ryan Smith, Natalie Diamond, Jason Hunt (Mentor), Alex Hallam (Mentor)

Total uterine glycogen levels are greatest before implantation then, decline rapidly during implantation and pregnancy to provide nutrients to the developing embryo. Glycogen comes from glucose that enters the cell through glucose transporters. Glucose transporters embed in the membrane in response to signals from insulin receptors. It is known that estrogen decreases Insulin Receptor (IR) sensitivity. However, the reason for the decrease in insulin sensitivity is unknown in the mink uterus. Our question was whether insulin sensitivity was due to the decrease of IR gene expression in the uterus or if it was due to some unknown mechanism. Mink uteri were removed from ovariectomized mink at three times (1) estrous, (2) implantation, and (3) post implantation. For each uterus, a sample was analyzed for: (a): total glycogen concentration and (b): relative gene expression levels for Insulin Receptor (IR) (the transmembrane protein responsible for signaling glucose transporters to fuse with the cell membrane). The data agrees with the hypothesis that insulin sensitivity is due to a decrease in IR gene expression.
Research and Creative Works Conference Database Development

Michael Decker, Hector Becerril (Mentor)

Smooth operation of Research and Creative Works Conference requires managing large amounts of information: what papers have been submitted; who submitted those papers; how will those papers be presented; when will they be presented; where will they be presented; who will they present with; and who will judge the presentations. Using Microsoft Access we have created an application where we can effectively and efficiently manage all the information for the conference. In the process of completing this, we solved the problems of gathering information via the web using SharePoint, controlling user access, and sending personalized emails to many different groups of people.

Livestock Tracking Device

Bryce Perry

Prototype device for tracking livestock. Device detects when it has been tampered with. Provides GPS coordinates through a wireless connection to an Android device. This is an Electrical Engineering project, in Embedded System design.

Levitation by ElectroMagnetism

Justin Harrison, Chad Rogers, Richard Grimmett (Mentor)

We are using home-made electromagnets over a two foot diameter area to cause another magnet to hover or float above the surface.

Wall-Avoiding Robot

Stephen Chow, Cody Mecham, Derek Nelson, Richard Grimmett (Mentor)

Our project is a robot that avoids walls with a sensor that sees if it is within a certain distance. The purpose of this project is to show what we have learned from the ECEN 460 embedded systems class. In a sense, it shows how we can create programs to communicate with hardware and the environment. In this case we used the Arduino microcontroller and its programming environment. We also used a ultra-sonic sensor to avoid the walls. This took in analog signals and then we converted it to digital so that we could control the robot to avoid the walls. Although the project is not finished we have got all basic functionality. We estimate that our project will be fully functional in two weeks.

Motorized Drumbone

Zack Sheffield

A PVC pipe instrument mix between a trombone and a drum, implemented with DC motors and solenoids, controlled with foot pedals.

Autonomous Quad Copter

Court Swenson, John Sebastian, Justin Harrison

We designed and built an autonomous quad copter that takes off and lands without communication from any outside source, and adjusts according to movement around it.
Emergency Bike Power

Cody Marshall, Taylor Martin, Richard Grimmett (Mentor)

Our project is designed to help us understand the relationship between electricity, magnetism, and mechanical power. We are focusing our project for practical use such as self-generating enough electrical power to charge a cell phone or other devices during emergencies, or possibly for other uses. The design of our own personal emergency electric power generator is based on using a bicycle to charge a battery by using a common DC motor as our generator. We intend to show how long it will take to fully charge the battery by pedaling at a certain rate and how long the user can use the battery before having to recharge it. Through these calculations we will develop an intuion of power measurements through understanding mechanical and electrical work to produce power.

Helicopter in 3D Plane

Kara Webb, Jason Fisher

Our project is controlling a remote control helicopter by designing a 3D plane with webcams. Then send IR signals to helicopter based on its location in this plane to control it moving around obstacles.

Raspberry Spi

Darren Leake, Rob Small, Taylor Martin, Richard Grimmett (Mentor)

The goal of our project is to build a quadcopter that has the capabilities of sending live video feed through a webcam wirelessly while flying. In order to accomplish this task we have to build a functioning helicopter and using capabilities of the Raspberry Pi microprocessor, we must enable it to broadcast live streaming video to a terminal to view. This project will help us more fully understand how to use an embedded system for different applications.

Roving Roadster

Matthew Ferrin, Thomas Taylor

Our project will consist of a small 4-wheel drive vehicle, an Arduino processor, and proximity sensors. The vehicle will autonomously detect and avoid obstacles. Optimization will be achieved through programming of an embedded system.

Metal Detector

David Stanger, Richard Grimmett (Mentor)

Construct a metal detector, creating a magnetic field. Build a circuit that can show a reaction in the magnetic field with metal and create a sound. (with a blip)

Personalized FM Radio Station Transmitter

Robert Small, Sean Nicolaysen, Paul Rossi, Richard Grimmett (Mentor)

Our project is a small FM transmitter that can be connected to a device such as an iPod. We can then select a frequency by use of a variable inductor and broadcast the music from the iPod to that radio station. This will permit us to listen to music over the radio from our iPod, i.e. in our cars, at home. We also have a microphone attached to the input so we can transmit voice signals to our radio. Such applications might be a spy listening device as well. The finished product should be a small package that can be connected to the iPod or left somewhere to listen in on someone.
**Wireless Power Transfer**

Rhett Arave, Tiago Rodrigues

This is a small scale demonstration of wireless power transfer between two coupled parallel LC tuned circuits, each consisting of a copper conductor loop acting as an inductor and a capacitor. Both LC circuits are tuned to equal individual resonant frequencies. Brought in proximity, the copper loops share a small mutual inductance, essentially forming a transformer. In order to transmit significant amount of power through this transformer a very large amount of reactive power needs to circulate in it’s primary, requiring use of a thick copper tube for the conductor, and a bank of capacitors in parallel. Receiver coil’s leakage inductance is in turn canceled out by another capacitor, allowing for the maximum power transfer to the load.

**Xavier**

Tiago Rodrigues, Richard Grimmett (Mentor)

This project deals with EEG signals (Brainwaves) and how, with the use of embedded systems, it can be used to control other devices. I will be demonstrating this capability using a small quadcopter.
Rocket Launch Rail

Tony Dumais, Mark Campbell, Tyler Seamons

The Rocket Launch Rail is designed to guide the launch of the BYU-Idaho Tonitrus sounding rocket. This Rocket is intended to reach 10000 ft altitude. To aid in this launch the rail is able to be adjusted from 0 to 90 degrees (horizontal to vertical) to account for wind, ground angle, etc. The rail can be set up to give over ten feet of rail length.

Команда Bulk Potato Bed

Joseph Boster, Dusin Tingey, Blain Craig, Calvin Cox, Brian Benson

Project Background: Agritech has just started selling equipment in Russia. This fall Agritech shipped four containers of equipment to Russia, upon completion of the first shipment; an order of 4 bulk beds has been received. Agritech would like to be able to maximize the number of bulk beds they are able to ship within one shipping container. Maximizing the number of units shipped in a single container will allow Agritech to remain a market leader. Agritech would like to minimize the number of changes to their current assembly line and manufacturing processes. Agritech's current bulk bed design needs to be redesigned for use in Russia. Russia's motor vehicle laws states that a trucks width can be no wider than eight feet. The current bulk bed design is eight feet 6 inches. Project Statement: Redesign a bulk bed assembly to facilitate shipment of multiple beds in a single shipping container, while maintaining or reducing production costs.

Fabric Positioning System

Michael Perez, James Meiners, Nathan West

Dawn Enterprises is a Idaho based company that provides job opportunities to those with limited physical abilities. One of their main company projects is with a branch of the military creating flash hoods. These are made from scratch by their employees on site. One step in the process is to lay out several layers of fabric that would then be cut into the patterns which would later be sewn into the hoods. These layers of fabric become heavy and inconvenient to move onto the cutting table. Our team’s objective is to come up with a simple but efficient design that would allow these employees to more conveniently relocate the fabric onto the cutting table. Although this process is simple in nature the mass production of these hoods cause the process to be completed regularly and therefore worth the time and effort to make the process as simplified as possible. By the end of this project our team will have; explored the design space for the best solution, followed the product development process to maximize the products capabilities, and provide the discovered solution to the customer at a cost of less than $300.

Solid Solutions-Waste Containment Solutions for the Nivacle People

John Downing, Kevin Tenney, Russell Aldredge, Nate Burton, Alan Dutson (Mentor)

The Nivacle people of Paraguay struggle with contaminated standing water due to current methods of human waste containment and heavy rains. Solid Solutions has been contracted to design potential ways to more effectively contain the communities human waste to help prevent contamination. The team has worked around issues concerning cost, available resources, complexity of implementation, complexity of maintenance, sustainability, effectiveness, and cultural acceptance to name a few. The resulting prototype will be implemented in the community for full testing and analysis.
Engineering
Mechanical Engineering, Poster Presentations
MC Grand Ballroom, 03:00 PM to 05:00 PM

Mechanical Engineering Design 380
Bryan Wright, Bruce Moore, JonCarlo Cabera, Scott Holt, Landon Lines

Our team of students have researched, planned and developed a product that takes an off-road light bar and we have made this light bar adjustable within the cab of a vehicle using an electric motor. Its design intent was to provide a product that performs this task for a much cheaper price compared to the market now.

Log Peeling Holder
Cayd Brunson, Kyle Nehring, Daniel Cutler, Brent Crowther

Log furniture makers and log home makers are in need of a device to better hold the log while manually peeling it. Our project allows workers to easily and more efficiently manually peel logs. It consists of two stands made of carbon steel. It is designed to be used against a wall in the dirt and be staked down. It is heavy enough to support the log and the forces applied during peeling. It is also light weight enough to be moved around if needed.

Tape Dispenser 3.0
Bryan Rovig, Andrew Holland, Ryan Gohnart, Rob Warnick, Jordan Nielsen

This project is going to help employees at Development Workshop Inc. (DWI) in Idaho Falls, Idaho. DWI employs people with various disabilities. Their employees build and assemble several products for government projects and for the general public. Some of their current projects include tape dispensers, sand bags for the armed forces, and shovel/pick covers for fire line cures. DWI has been helping disadvantaged people achieve their level of independence since the 1970’s. Some of their employees do not have the skills necessary to complete some of the assembly operations. The process that DWI has requested assistance with is the filling of the tape dispensers with sand. The current method that DWI utilizes is to physically hold the dispenser onto the end of a funnel/ auger sand dispenser. The task of holding the dispenser to the bottom of the funnel is problematic because it has to be done with one hand free in order to press the auger button with the other hand; the worker also has to hold the dispenser at the correct angle in order to achieve smooth sand. The worker then has to weigh the sand on a digital scale and then add or remove sand as needed. The task described is proving to be too complex for many of the disabled workers at DWI. The new device they are currently looking for will help their employee’s angle and fill the tape dispensers to a preset amount of sand. With the aid of this new device DWI will be able to help more people experience the sand filling portion of the tape dispenser assembly process.

Tire Traction Bars
Kelsey Bernard, Cody Petterson, Paul Cordova, Jesse Holdaway

The tire traction bars are a series of bars that wrap around the tire to aid a vehicle obtain traction. The device is designed to be an alternative to snow tire chains. By using the tire traction bars it is possible to attach the device to the tire quickly and easily without damaging the vehicle. The device is made out of aluminum which makes it light and durable. It is designed for an SUV type vehicle with a variable tire size.
Hawk-Eye

Brady Haws, Ryan Lee, Kyle Davis, Dustin McMurtrey, Brent Decker

Eric Conrad is the Facilities Management Director at Brigham Young University Idaho and he also helps coach the Madison High School soccer team in Rexburg, Idaho. In order to help the soccer team improve, Eric was looking for an economic video recording system capable of filming team competitions and practices for future review. While many recording systems exist from do it yourself projects to high-end fly over systems, Madison High was in need of a professional, economic solution capable of filming sporting events. A team of mechanical engineering students completed a camera system for Eric Conrad. Elements of product design were coupled with engineering analysis to ensure Eric’s satisfaction of the project.

Nivacle Innovations

Brad Gill, Neil Ralph, Stephanie Morco, Sam Hulse

Over 2 billion people around the globe face unsanitary bathroom conditions. Many of these affected people live in small villages or tribes on their native lands where solutions from large infrastructure are unreasonable and simply not feasible. This is a worldwide problem in need of a viable solution. Dr. Larry Shaw, health science professor at BYU-Idaho and industrial hygiene & safety specialist, partnered with mechanical engineering capstone teams to develop a human waste management solution for a Nivacle tribe in rural Paraguay. In the specific region, flooding during the rainy season washes out shallow holes filled with human waste and reintroduces it into the inhabited land of the people. The prototypes developed by the teams represent potential solutions that may be implemented in coming months.

EasyGreen (windTurbine)

Brady Wilcox, Stuart Boydston, Jon Clift, Mike Duke, Adam Hagland

The wind turbine design is a simple, easy to put-together wind turbine for those interested in harnessing energy from the wind. The wind passes through the wind turbine blades, causing the blades to rotate. This is due to the change in pressure on either side of the blades. The rotating blades turn a shaft, which is connected to a generator that produces electric power. The power is transported through wires to a charge controller. The charge controller regulates the amount of power that enters the energy storage system (battery). The charge controller also prevents the battery from overcharging. The energy stored in the battery can then be used to power small electrical components.
**He Thought of Himself**  
Scott McDonald  

A story where death ponders his unique existence and eventually meets Life.

**What Happened in Germany, at a Dusky Hour**  
Kīra Jacobsen, Scott Samuelson (Mentor)

This project is composed of four poems. The theme is "personal experiences in Nazi Germany." Three are based on anecdotes told to me by family of the poems' speakers. They are dramatic monologues in form. "Bruders" is based on a tale shared by a member of the bishopric in an old school ward. His grandfather was held by the Gestapo for months before he was released by the Kommandant, who found out they were both LDS. "Johan's Farewell" (title may change) is based on the account a German friend of my grandparents shared about her father's death. "So a Nazi and a Mormon Missionary Go to Nuremberg for a Rally..." is based on an experience my great-grandfather had on his mission in pre-World War II Germany. He was taking pictures at a parade and the Gestapo did not like that. In addition to these stories I have heard, I am also moved by things I have read and watched, as shown in the fourth poem. It is a short lyric inspired by the film A Woman in Berlin: "The Nazi official's wife shrank back from the Russian soldier as stepped toward her, slinging his rifle over his shoulder." I wrote these because I inherited my father's love of history and particular interest in World War II, especially Germany's role. I feel a personal connection to Germany because of my family roots, which Dad is very proud of: Great-grandpa Jacob Christian Jacobsen, from Norder Waygaard, Schleswig-Holstein. Also, I love true stories, which connect me to people from times and circumstances I will never experience. When I hear certain stories, I want to share them. Poetry is how I fulfill that desire. This project is provides a new lens for looking at the people who experienced World War II Germany. These poems are a way to tell truth beautifully about family, human stories, mating literary art with history. May we remember the past through these poems, and learn lessons for the future. I should like to think I am as Siegfried Sassoon and Wilfred Owen, those World War I poets. Of course, they do have a leg up on me since they actually fought in the war.

**Penny Nichols' Not So Ordinary Day**  
Breanne Richards, Joshua Allen (Mentor)

For my submission, I wrote a fictional short story entitled "Penny Nichols' Not So Ordinary Day." It is 2,680 words and was written for my Creative Writing class with Brother Joshua Allen. It went through numerous workshops by various peers and my professor and was edited progressively until I reached the final project. The work is based off of an embarrassing experience my younger sister had on her first day of middle school. Using this experience, I focused on imagery, metaphor, and character voice to bring the story to life. The following is a summary of the short story: It was never going to be an ordinary day for Penny Nichols. Coming from the universe of immature, obnoxious elementary school boys, Penny was beyond ready for some "real boys" in her life. In the midst of her excitement, there was one thing that stood in her way of having a great first day at Local Snot Mental Society (aka Lowell Scott Middle School): her toad of a bus driver. No seriously . . . you think when I say toad it's a joke but it's not. Her bus driver was the closest thing to a crossbreed of human and toad Penny had ever seen. After quickly establishing a bad relationship with her croaking new enemy, her dreams of finding a "real boy" and fitting into middle school could be down the drain. But of course, it was never going to be an ordinary day for Penny Nichols, was it?
**Mine**

Christopher Cunningham

"Mine" is a short story. It seeks to exploit the drama of the recent missionary announcement by looking at a couple in a nascent relationship and the pressures that the announcement puts on them. A major contrast in the story is between the protagonist's boyfriend, and a man who's stalking of her has recently turned violent. The piece experiments with genre by combining the dialogue and relationship elements of literary fiction with plot elements of suspense fiction.

**Death and War**

Breanne Richards, Jim Papworth (Mentor)

For my submission, I have written and developed three separate poems on the subjects of death and war. They were all written for my Poetry class under the direction of Brother Jim Papworth. The first poem is a metaphor for death through the image of a fish getting caught on a hook and being pulled to the surface of a river. The second poem is a metaphor for death through the story of a young cancer patient in a hospital room, comparing her surroundings to a wedding she'll never have. The third poem is a metaphor of war and death based on the popular line "All Quiet on the Western Front," describing a young soldier's experience of realizing that the silence of the Western Front in fact means death. In all three poems, I have focused heavily on sounds, diction, imagery, and metaphor to create a powerful and moving experience for my readers.

**"A Call to Help"**

Arthur Lee, Matthew Babcock (Mentor)

"A Call to Help" — a short story about a man’s cry for help and the strangers who answer that call. “But what if there’s something in it? A note maybe.” Fifteen feet away, a large glass jug bobs in the Puget Sound—up then down, up, down, down, then gone—only to resurface seconds later, seventeen feet back. A biting breeze clambers across the skyline, shifting the sullen cloud cover away from the sun.
Scott Horsley: Profile Paper

Nathan Dorny

Scott Horsley is an endodontist, or a dentist who specializes in root canals. He loves his job and the freedom it provides to support his family, both financially and with his time. He grew up in Idaho, where his wonderful parents taught him to work hard and be diligent. While on his mission, he had the thought that he should work on his newly discovered talent of memorization. When he returned home, he focused on developing this talent, and now is at the point where he can remember things very quickly, within a few minutes even. He has done this by daily dedication to memorization; memorizing something new every day for years. He has seen this benefit him in his career which is very technically driven, and in his own personal life. He feels a greater control over his mind, and is able to give a talk, even when he has been given no time to prepare it.

Security guards are not to be trusted.

Kelsea Morrison, Robert Brown (Mentor)

A couple years ago, my friends and I got our hands on 4 free tickets to a Justin Bieber concert. The concert itself was crazy enough but after was even crazier. We discovered that an old man was going around, speaking to all the young girls, none of which knew him. We told security that we were worried and then security told us. The man was apparently guilty, as he ended up chasing my friends and I all the way to the train. I learned the hard way that security guards are not police, therefore, I should not expect them to act like police. They are young, immature, and more concerned about their ‘swag’ than keeping people safe. Next time I have I’m around a security problem, I’m calling the police.

Change

Steven Daper, Robert Brown (Mentor)

A young man is trying to be someone he is not and has trouble fitting in. He tries doing things that will make people accept him but finds it unsuccessful. He gives up on having friends. The young man was at dinner when his dad told him that he knew that he was gay and he loved him anyway. The young man started feeling better from this point on. He trains for a half marathon and is excited about his progress in life and as a runner. He is ok in the end.

Keys and Mumu’s

Mary Osborne, Robert Brown (Mentor)

Imagine walking out your door to pick up the paper. Enjoying the warm sun, you side-glance into your neighbor’s yard not expecting anything out of the ordinary, then quite surprised, you do a double-take. In your neighbor’s yard there are papers, milk cartoons, egg cartons, apple cores, baby diapers and lots of other gross things all along the curb. Amongst all the overturned trash cans, and clawed opened bags, there is a beast with wild lion hair ripping and scavenging through the mess. Then you see that the beast is wearing a hot pink, Hawaiian Mumu. Sensing that someone else is around, Stephanie Wallis turns to look back at you. Giving a sheepish cheesy grin she waves, says hello, then continues to dig. Stephanie Wallis is a mother of six children all under the age of ten. She’s very talented at keeping organized—in fact maybe a bit too much. Whenever she cleans the house, she makes room for new things by throwing out the old. Doing this she sometimes loses things and immediately she thinks she’s placed it in the garbage. Then once she starts looking she won’t stop until it’s found. And every time, she finds it. This is Stephanie’s story...
“Disneyfication”: How Adaptation of Literature Effects Youth

Alina Cash, Russell Lovelett

The adaptation of literature in the medium of film has proven to be difficult. When entering a movie whose plot is based off of a novel, audience members arrive with preconceived ideas of the movie, ready to compare it to the written work. More often than not, one will hear the viewers say something similar to how they liked the book better. Often times the film has changed the morals and essentials of the written story. What is not understood by the average viewer is that movies take away the imagination of the consumer, causing the audience to believe what the creators want them to believe. The plotline and appearance of the characters becomes concrete. While reading a novel, the interpretation is dependent upon the reader. With movies, it is quite the opposite. The audience does not have the liberty to create their own conclusions about the film, how it makes them feel, or what they believe to be the essential themes. The movies confine the imagination and projects their characters in a way which creates idealization. Movies, being motion images, are taken from the perception of a staff of screen writers, animators, producers, etc. Therefore, the ideal of the individual reader is nullified. Do these writers take it too far though? How does taking the imagination out of the process change the product?

Reality Check: How Dreams Reveal Personal Destiny in "Funes, His Memory," "The South," and "The End"

Brad Petersen

Albert Einstein once stated, “Reality is merely an illusion, albeit a very persistent one” (1). At times reality can feel so dull that this must certainly be the case. Einstein indeed brings up an important point – how do illusions and reality relate to one another? Jorge Luis Borges’ stories, “Funes, His Memory,” “The South,” and “The End” ask this same question by employing dreams as a form of illusion versus a mundane reality. Main characters from each story drift in and out of dreams while the real world remains little more than a relatively vapid life. Characters do not pursue a specific destiny or end-goal. An important question raised by each story is how the individual will discover his personal destiny. All three main characters shy away from seeking a personal destiny until it is abruptly forced upon them in a dream. Do we as humans reach an epiphany in regards to our destiny by submitting to the demands of a dream, or are we satisfied with infinite postponement in a world of regular reality? Through analysis of each story it is found that dreams can provide an escape from this dismal existence and a window into each individual’s personal destiny. Each character in the three analyzed stories faces difficulties in regards to his personal destiny. The characters are led past their unsure reality into a dream-like experience that ultimately teaches each what their personal destiny is to be. The juxtaposition of each character’s reality and dreams reveals that to achieve one’s personal destiny, one must embrace dreams, allowing them to overpower a dull and monotonous reality.
Creeley’s “I Know a Man”: An Existential Nihilist Manifesto

Theophillus Smith, Scott Samuelson (Mentor)

This analysis looks at the poem “I Know a Man,” by Robert Creeley. The poem is a well-known, ambiguous piece of American Beat culture. The poem, as well as its interpretation, is culturally and literarily significant because it attempts to capture a large portion of American society at the time of its writing. However, there are very different interpretations about what its message of American culture is. The poem is held by some critics to be a work expressing doubt characteristic of post-World War II America. Others believe the poem to be an expression of religious hope. This analysis looks at these conflicting interpretations and extensively uses the text of the poem itself, drawing on its rich symbolism and complex use of religious names. This focus leads the analysis to arrive at the conclusion that the poem is in fact a work of negativity and expresses the view that life has no meaning.

"The Lifeblood of Twilight"

Eric McLean, Phil Murdock (Mentor)

"The Lifeblood of Twilight" is an article written based off of a research paper on feminism in young adult literature. It is formatted with Microsoft Publisher to look like a magazine or newspaper article. It is also written in the tone of an opinion editorial. The article focuses on how the books series Twilight is anti-feminist and portrays women in a weak, vulnerable, and negative manner. It focuses on how this negatively impacts young readers, young men and young women alike. It includes researched information and an interview with a high school AP English teacher.

Why We Like Richard: The Revolutionary Character-Audience Relationship in the Opening Monologue of Richard III

Christopher Cunningham

Why We Like Richard: The Revolutionary Character-Audience Relationship in the Opening Monologue of Richard III is a piece of literary analysis. It looks at Shakespeare's Richard III and engages one of the questions that has most vexed scholars of the play: Why is the morally depraved Richard so lovable? The paper answers this question looking strictly at the opening monologue that begins the play, the play's first forty-one lines. It looks at the historical impact of the play including Shakespeare's unique approach to exposition, Shakespeare's possible political motivations, and the 16th century ethical argument about the value of appearance in moral judgments. The paper also looks at the relationship Richard builds with the theater audience in the opening monologue, by contrasting that relationship with an in-play audience, breaking the fourth wall, and treating the theater audience as a favored friend. In addition the paper examines the often contradictory approaches Richard takes to appealing to the audience. By looking at these elements within the play's opening monologue, the paper seeks to answer the question of why four hundred and twenty years after the play was written the main character remains beloved.
The Pocatello Fire of June 2012

Jason Hooper

I am constructing a map that describes the area of Pocatello Idaho that was devastated by a wildfire on June 28, 2012. This fire forced over 1,000 residences to evacuate, and during the blaze, 60 homes were consumed. Pocatello is surrounded by vast amounts of dry grass and brush, but now that part of this vegetation is gone, there is a concern for erosion. If there are any homes that remain in either fire hazard or erosion hazard areas, I would like to identify those areas so that preventative measures can be taken. Using a DEM (Digital Elevation Model), I was able to take several steps to create layers that show the direction of water flow based on the steepness of slopes in and around Pocatello. Overlaying these layers with a Land Cover data map, presents a clear picture of the whole situation that the city of Pocatello is dealing with. To make things more personal, I geo-referenced a couple of aerial photos of the region that was burned used made some layers slightly transparent, and gave the map a hillshade for a stronger visual of what the topography looks like. After everything I have studied thus far about the region of Pocatello, I can definitively say that there are dangerous locations where homes should not be built unless dry vegetation is removed. I have also concluded that homes which were saved from the fire may not be ‘out of the woods’ yet. I plan on further investigating the type of soil that dominates the region that was burned, so that I may also learn what angle of slope is required for erosion. I can then in turn use ArcGIS to create a layer that defines the areas of potential erosion based on slope. In the end, I trust that this map could be useful to the city of Pocatello to help identify more danger locations, to help prevent erosion and more fires from happening.

3-dimensional subsurface modeling of heat flow of the western Snake River Plain, Black Rock Desert, and Imperial Valley

Trevor Atkinson

Geothermal energy exploration in the United States is vital to this nation’s future. Research performed on three specific areas of interest, chosen on the basis of high heat flow values indicated on Google’s EGS map (2011), identifies potential reservoirs of heat that can be harnessed to produce clean and renewable energy. These areas include the western Snake River Plain near Boise, Idaho, the Black Rock Desert near the Granite Range of northwest Nevada, and the Imperial Valley of California near the Salton Sea. Based on well data obtained from the Global Heat Flow Database of the International Heat Flow Commission, 3D subsurface models were generated with GIS software, displaying the relative heat flow values. The three study areas all exhibit a geologic province of highly faulted/fractured valleys. It is interpreted that the faults and fractures combine to create conduits to facilitate heat flow in large quantities, more than double the mean heat flow of continental crust, to escape to shallow depths of less than 200 meters.
Stratigraphic Sections Can Be Correlated Using Fossil Body Size in the Early Mississippian Lodgepole Formation of Idaho and Montana

Tony Pugliano

The Early Mississippian Lodgepole Formation of western Montana was deposited in a carbonate ramp to slope setting on the east side of the Antler foreland basin. Many marine animals, including crinoids were exquisitely preserved throughout the Lodgepole Formation, facilitating studies of paleoecology and biostratigraphy. Although articulated crinoids are found only in a few horizons, disarticulated columnals are found throughout the Lodgepole Formation. Previous work has demonstrated that body size is a fundamental ecological property that varies with bathymetry and that crinoid columnal diameters correlate significantly with lithofacies (bootstrap, $p = 0.02$) and sequence stratigraphic architecture. Generally, larger columnals dominate in regressive shallow-water grainstones, and smaller columnals are more abundant in deeper-water transgressive and highstand mudstones. Because of the significant relationship between lithofacies and crinoid body size, we predict that stratigraphic sections can be correlated using crinoid columnal diameters alone. To test this prediction, two complete stratigraphic sections were measured and described in the Lodgepole Formation: (1) No Man Ridge, Madison Range, Montana; and (2) Mount Jefferson, Centennial Range, Idaho. In addition, crinoid columnal diameters were collected from each section (30–50 from each unit). From No Man Ridge, 43 units were described in 538’ of measured section, and 2,580 columnal diameters were collected. From Mount Jefferson, 22 units were described in 260’ of measured section, and 1,100 columnal diameters were collected. Trends in crinoid columnal diameters from both sections exhibit strong similarity, suggesting that patterns of change in fossil body size among stratigraphic sections may represent a useful tool for correlation.

The Channeled Scablands of Eastern Washington

Kris Gayda, Mark Lovell (Mentor)

Repeated cataclysmic floods during the end of the Wisconsin Glaciation (20 – 15 ka) sculpted what is referred to today as the Channeled Scablands of eastern Washington. As the floods swept across eastern Washington, they stripped hundreds of feet of soil down to the underlying bedrock and carved out a massive system of coulees. The only outlet to the Pacific Ocean was through Wallula Gap, a narrow passage in the basalt. This caused the flood waters to temporarily pond behind the gap and drop their sediment loads in the Pasco Basin creating a temporary lake. This project analyzes the distinguishing features and the evidence that led geologists to accept the theory of catastrophic floods creating the landscape eastern Washington has today. A map made with GIS software that illustrates the path of the flood waters is included to enhance the understanding of the size of the floods.

Flood Risk Analysis

Cara Kappel

Oro Valley, Arizona is located in the Upper Santa Cruz Basin, which has experienced several destructive floods over the last century. This study addresses the flood potential of recent retail development and a new hospital in the Oro Valley area. A flood analysis was completed in a geographical information system program to determine the flood plane boundaries for the Oro Valley Hospital and the Oro Valley Marketplace. Further analysis was done to determine if the buildings meet requirements for the Federal Emergency Management Agency (FEMA). Since emergency facilities have higher FEMA code requirements, special attention was given to the location of the hospital.
Predicting Cascadia Coseismic Coastal Subsidence using Elastic Dislocation Models Developed from the 2011 Tohoku Earthquake

Stewart Gubler, Jeffrey Jex, Julie Willis (Mentor)

The 2011 Tohoku earthquake (magnitude 9.0) and associated tsunamis resulted in substantial destruction, causing over $300 billion in damages and over 15,000 deaths. The earthquake also caused areas of the Japan coastline to subside up to 1.1 m, which compounded the effects of the tsunamis. The Japan subduction zone is very similar to the Cascadia subduction zone offshore northwestern U.S., where the subducting Juan de Fuca plate causes megathrust earthquakes similar in magnitude to the Tohoku quake every 300 to 500 years. The last Cascadia rupture occurred in 1700 A.D. A great earthquake on the Cascadia subduction zone has the potential to mimic the coseismic coastal subsidence and massive tsunamis of the Tohoku quake. An elastic dislocation model is used to model a Cascadia rupture and predict coseismic subsidence of the coasts of Washington and Oregon. A similar dislocation model of the Tohoku earthquake is used for calibration and comparison. The Cascadia model is combined with tsunami inundation maps to evaluate tsunami risk hazards for the U.S. northwest coast. The model predicts about 2 m of subsidence along most of Washington’s Pacific coastline.

Groundwater Importance of the Warm River in Northeast Idaho

Drew Reynolds, Drew Scrivner, Mark Lovell (Mentor)

The Warm River is located in Eastern Idaho, Northeast of Ashton. The Ashton economy is very strongly dependent on the farming industry, therefore every drop of water is counted and needed every summer. This is especially true in the recent history due to droughts in the area. We have chosen Warm River for our study because a majority of its water comes directly from groundwater and has yet to have flow meters monitored by the USGS. Our study area is along an 8 mile stretch of the river that has numerous springs that more than double the overall flow of the river. Fluctuating groundwater discharge is of great concern due to water being one of the main components to successful farming. The main contributor to the fluctuating ground water is precipitation, mainly in the form of snowfall, however well drilling in the area will effect the amount of ground water that’s available. Our study has been to discover the true importance of groundwater to the Warm River system and what impacts humans have on its discharge. Through creating river profiles and measuring flow rates of springs we are able to find capacity contributions of springs on the river system. Recent droughts and the constant pumping from the local aquifer would be costly to the local economy. Repercussions on the local economy would be great should groundwater discharge begin to diminish. Protection of this river system should be a considered just as the Henrys Fork of the Snake river has been protected.
**Sequence Stratigraphic Analysis of the Gannet Group, Caribou Mountains**

Steve Nielsen, Tony Pugliano, William Little (Mentor)

Interbedded terrestrial clastic and freshwater carbonate deposits of the Cretaceous Gannet Group of the Caribou Mountain Range, Idaho/Wyoming, record a cyclical pattern related to early development of the Western Interior Basin. The Gannet Group was deposited as an alluvial fan system that graded basinward into freshwater lakes, and producing distal to proximal fan coarsening-upward successions. Because this area is strictly continental, influences on depositional patterns are restricted to tectonic and climatic processes, providing an opportunity to study sedimentary architecture and apply sequence stratigraphic principles to base-level controls in a purely non-marine setting. Stratigraphic units within the Gannet Group have been correlated along the Idaho/Wyoming border from Jackson in the north to Evanston in the south; however, most published sections are highly generalized and have not been interpreted in terms of base-level controls. This project includes a detailed description and correlation of three closely spaced measured sections, throughout the entire Gannet Group, with the objective of applying sequence stratigraphic concepts to a purely continental succession of strata in a developing foreland basin. Additionally, photomosaics are used to develop facies models, establish systems tracts, and identify bounding surfaces.

**The Phosphoria Formation; a Potential Resource Play**

Michael Weggeland, Mark Lovell (Mentor)

The Phosphoria formation located in southeastern Idaho and western Wyoming contains organic rich members that are significant to oil and gas exploration. The Permian age formation has already produced 6 billion barrels of oil. Although much more drilling has occurred in Wyoming, development of resource plays has caused recognition that great potential still exists in southeastern Idaho. This project focuses on oil and gas exploration wells that have been drilled in the Swan Valley, Idaho region. Interpreting gamma ray logs from the wells, the respective members of the Phosphoria Formation will be correlated from well to well and used to create a cross section. Since there is a correlation between depth of burial and maturation of the source rock material, determining the current depth of the rock layer is important in establishing its potential to have generated hydrocarbons. If the formation is determined to be sufficiently mature, the region can then be considered a potential target for resource play exploration as opposed to the traditional prospecting philosophy that was in place when the existing wells were drilled.
Heise Volcanics, Caldera Boundaries, and Basaltic Fill of Paleoriver Channels: A Geologic Strip
Map of the Ririe Reservoir Area, ID

Trevor Atkinson, Ryan Tracy, Vanessa Thornton, Ben Engleman, Doherty David, Glen Embree (Mentor), Dan Moore (Mentor)

The Ririe Reservoir area lies near the southern margin of the Snake River Plain in southeastern Idaho and is part of the Yellowstone Snake River Plain (YSRP) magmatic province. We report detailed geologic field mapping of the area, and compositional and paleomagnetic data of basaltic units. Bedrock geology in the area records multiple episodes of local rhyolitic volcanism from the Heise calderas (~6.5 – 4.5 Ma), including the formation of two rhyolitic calderas; at least two episodes of local basaltic volcanism; and the Huckleberry Ridge Tuff (Qyh), from the Yellowstone I caldera to the northeast (2.1 Ma). We map the Heise rhyolites as three units: the tuff of Edie School (Th, ~6.5 Ma, sometimes referred to as the tuff of Blacktail), intermediate tuffs and local air-fall deposits (Thi), and the tuff Heise (Thh, ~4.5 Ma, sometimes referred to as the tuff of Kilgore). We identify caldera boundaries associated with the tuff of Edie School and at least one of the intermediate tuffs. Basaltic volcanism includes a diktytaxitic unit (or units; Qdb) that lies below Qyh and a unit with plagioclase megacrysts (up to ~4cm) that lies above Qyh. Where basaltic units are thick they record the location of paleoriver channels, which are adjacent to present canyons. Bedrock volcanic units are underlain and juxtaposed next to Mesozoic sedimentary rocks, and are locally covered by alluvium, colluvium, loess, and landslide deposits. Basalts of the area are tholeiitic / ferroan and Nb-rich. The megacrystic basalt plots with the normal basaltic YSRP magma series. The diktytaxitic basalt plots with the extensively-fractionated YSRP magma series. The megacrystic basalt record a normal polarity; whereas the diktytaxitic basalt is reversed.
Simultaneous Chromatography and Electrophoresis: Effects of Applied Pressure and Electrolyte Concentration

Justin McKell, Peter Stevenson, David Collins (Mentor)

Simultaneous electrophoresis and chromatography of dyes, amino acids, and vitamins has been previously demonstrated. At low voltage, dilute electrolyte concentration, and no pressure many samples display lateral streaking. Increased pressure and electrolyte concentration may reduce streaking by eliminating surface electroosmotic flow and nonuniform electric field profiles across the plate, respectively. Pressure was applied with Plexiglas™ plates of varying thickness and glass plates. Initial experiments with increased pressure produced inconclusive results; however, increased electrolyte concentration has demonstrated a significant reduction in streaking.

Simultaneous Chromatography and Electrophoresis

Brae Petersen, Paul Powell, David Collins (Mentor)

Simultaneous chromatography and electrophoresis (SCE) has allowed for improved separations of complex mixtures. Separations of vitamins, amino acids, and dyes have been performed with unique electrolytic mobile phases at 500 V to promote electrophoresis. These conditions have provided reproducible results. However, streaking and unexpected motion of certain analytes and mobile phase have inspired efforts to further improve separation conditions and better characterize the new technique. Increased voltage was investigated. Mobile phase flow, including nonuniformities, were evaluated. Disadvantages of increased voltage may include an increase in electroosmotic flow, a greater pH gradient, and excessive heating.

Data analysis for Light, Sound and perception class: does opinion regarding science change as a result of the class?

Jayna Powers, Joshua Abbott, Brian Pyper (Mentor)

We are studying demographic information with pre and post data in the FDSCI206 class, called Foundations of Light, Sound, and perception, Winter Semester. Fall Semester and summer semester of the same class in the same year will also be analyzed, but only the pre and post data, and not demographic information. So far, we have not seen very many dramatic patterns in changes of point of view, but we do hope see a positive change in attitude towards science as a result of the class.

Fixing the S Parameter

Kevin Laughlin

The S parameter is an indicator that is used to find the defect density of a material and is found by using Positron Annihilation Spectroscopy (PAS). PAS is a non-invasive way of determining the defect density of materials, thus quantifying a material’s integrity, by finding the S parameter. When a positron and electron annihilate, they emit two gamma rays with energies peaking around 511KeV. How close to 511Kev those gamma rays are depend on how many defects there are in a material. The S parameter is calculated from how wide or narrow the energy peak is. The placement of the material in reference to the detector can cause changes in the measured S parameter that don’t actually occur, adversely affecting the data. The cause of this error was investigated in order to minimize it. It was determined that the detector had a higher count rate the closer the source is (15 cm or closer), but the systematic error in the S parameter increases. But the closer you get, the S parameter starts to become altered as well. It was determined that the error in the S parameter was due to pulse pile-up and incomplete data being collected by the detector.
Symmetry Mode Analysis Applied to Determining Magnetic Structure of Materials

Joseph Carmack, Branton Campbell, David Oliphant (Mentor)

The study of magnetic structures of materials is a fascinating field of study and has many important applications in Multiferroics. Characterizing magnetic structures of materials is experimentally challenging and analytically complex. Over the summer I worked with Dr. Branton Campbell with the BYU Physics Department on a research project focused on simplifying the analytic side of magnetic structure characterization. Dr. Campbell and others have been developing symmetry-mode analysis (SMA) to determine the distorted atomic crystal structures. This involves representing the atomic structure of a lower symmetry crystal with adapted symmetry distortion modes of a higher symmetry parent structure instead of the traditional xyz atomic coordinates. These adapted symmetry modes are used as free parameters in fitting models to powder diffraction data. Global optimization techniques such as mode-amplitude histograms and custom made python scripts are then employed to identify the active modes in the distorted symmetry. SMA can greatly simplify the problem of determining the distorted structure of crystals because the dimension of the parameter space is reduced significantly. The goal of this research project was to extend SMA to magnetism in materials. Just as the details of the atomic structure of a crystal can be represented with adapted symmetry distortion modes, so too can the magnetic structure details (or the orientation of the magnetic moments within the unit cell) be represented by adapted symmetry distortion modes. We attempted to employ the same global optimization techniques used to determine the displacive distortion crystal structure in order to determine the magnetic structure. La0.5Ca0.5MnO3 (LCMO) was chosen as the material to be analyzed. LCMO has been studied before which allowed us to compare our results with the other studies. However, from our analysis of LCMO, it was discovered that there exist limitations to SMA when applied to determining magnetic structures.

Thin Film & Vacuum Technology

Stefan Lofgran

The study and development of thin films via physical vapor deposition has played a significant role in the development of optical coatings, semiconductors, solar cells, etc. Closely related to the study of thin films is the development of vacuum technology and systems capable of reaching pressures suitable for growing uniform films at reasonable deposition rates. In particular, the method of physical vapor deposition known as thermal evaporation via resistive or Joule heating is explored as a means for growing thin aluminum (Al) films on a mineral glass substrate. Methods for measuring thickness are also discussed and investigated in an attempt to determine the experimentally produced film thickness. A detailed explanation of the development and operation of the vacuum system in which the Al films were grown is given as well as future improvements that could be made.
Blood Flow in CFD

Stephanie Morco, Russell Daines (Mentor)

Blood flow through a “clogged” artery will be modeled and analyzed with computational fluid dynamics. Plaque build-up in an artery causes heart disease for two main reasons: first, the passageway can become so small that blood clots and other objects get caught and block the flow and second, the plaque could get a small tear which would cause the blood to clot in that location which could grow large enough to cut off the blood flow completely. In order to correctly analyze the effects of plaque build-up, three artery models will be compared: normal, slight plaque build-up, and severe plaque build-up. The normal artery will be seen as the “control,” so the flow in the arteries with plaque build-up will be compared to normal blood flow. The plaque build-up should cause recirculation zones to form, which would decrease the efficiency of circulation system. The blood flow will be modeled as accurately as possible. The artery size, velocity, and material properties are verified by research on several internet websites and published journals. Because the heart pumps blood in pulses, the velocity varies depending on the stage in pulse’s cycle. Another complication in this project is that blood is a non-Newtonian fluid because it is made up of plasma, red blood cells, platelets, and white blood cells. The main goal of this project is to clearly see how plaque build-up affects blood flow, and a secondary goal is to increase public awareness concerning heart disease.
Measuring the Depth of Defects by Positron Annihilation

Kishor Prasain, Evan Hansen (Mentor)

Positron annihilation was used to measure the damage in copper based on varying depth of thickness. No other technique is as sensitive for measuring the underlying defects as positron annihilation. This topic is intriguing because it could be used to determine the absolute number of defects on different metals. High purity copper chips were obtained in pairs. The S-parameter for all of these pairs was measured using Na-22 as a radioactive source and High purity germanium detector. They were annealed at 500°C using Argon gas to restrict the reaction with air. These samples were measured multiple times, which helped to see that the level of defects were very low. S-parameter showed that they were close to each other. Different levels of defects were introduced in each pair using slurries. Slurries with different particle sizes were used to introduce defect layers of different depths. The damage thickness was measured using positron annihilation and the S-parameter showed different level of defects as some positrons penetrated the sample past the damage layer. The results were clear proving the hypothesis that we can measure damages on these chips by positron annihilation. The S-parameter showed variation among these chips proving that each has different depths of defects. We will refine this process to determine absolute defect densities with sensitivity not possible with other techniques.

Numerical Modeling of Positron Annihilation

John Barrett, Evan Hansen (Mentor)

A numerical method for simulating positron annihilations in a solid is used to produce theoretical data, including the momentum distribution of incident positrons at annihilation. Momentum distributions are produced for atomic super structures of Copper with varying amounts of defects. A method for comparing contributions in annihilation from valence electrons—more common in defects—versus core electrons—more common in the absence of defects—is developed, and observable parameters are declared. Theoretical parameters are compared with experimental results collected by the BYU-Idaho Physics Department.

Investigating Martian Drainage Patterns of Ius Chasma

Parker Crandall

Mars has always been a fascinating research site for planetary geologists as many believe it provides a glimpse of Earth’s early geology. Valles Marineris, a vast canyon system spanning a distance of over 4,000 km, is an especially intriguing geological feature with its many landslides and oddly shaped dendritic drainage patterns. These offer evidence for the existence of forming plate tectonics and moving water in times past. The research conducted here employs the use of MOLA, THEMIS and HiRISE datasets collected by the Mars Odyssey spacecraft and integrates them into a geographical modeling system. The result was used to investigate several drainage systems in Ius Chasma, a western region of Valles Marineris, to determine the conceivable contribution of plate tectonics and potential fluids in the formation of these features.
Modeling Basaltic Paleo-Canyon Fills of the Henry’s Fork in Island Park, Idaho

Benajmin Engleman

The Henry’s Fork of the Snake River is located in Island Park (eastern Idaho) in the south-western portion of the nested Yellowstone I and Henry’s Fork calderas. Over the past 1.2 million years, basaltic eruptions have largely resurfaced the floor of the Henry’s Fork caldera. Many of these flows entered and partially filled the Henry’s Fork river canyon. The river then incised a new course, typically along the edge of a flow—leaving a record of basaltic channel fill as terraces along the canyon wall. These terraces record the location of paleo-canyons. We correlated these terraces to basaltic lava flows using petrographic, compositional, and paleomagnetic data. We use GIS and EarthVision to model the history of interactions between the basaltic lava flows and the Henry’s Fork river canyon.

Composition and Petrogenesis of the Basalt of Spencer-High Point

Joseph Grigg, Dan Moore (Mentor)

The Spencer-High Point Rift Zone (SHPRZ) trends roughly E-W across the Eastern Snake River Plain (ESRP), and belongs to the Yellowstone-Snake River Plain volcanic province (YSRP). We report the major and trace element compositions of rocks from SHPRZ eruptive vents (including spatial variations) and fractional crystallization modeling designed to understand the origin of these compositions. SHPRZ rocks are dominantly mafic but include some intermediate compositions: ferroan, calcic to calc-alcalic, and Nb-rich. Most SHPRZ compositions trend with the normal YSRP basalt magma series. The rift zone also contains compositions that trend with the Craters of the Moon (COM) series. Our major-element modeling is consistent with favored models for the origin and evolution of YSRP mafic and intermediate magmas (e.g., Putirka & Kuntz, 2009; Christiansen & McCurry, 2008) and suggests that deep fractionation influences the chemical evolution of YSRP basaltic magma.

Possible Dam Breach Caused By Rock-Avalanche-Generated Waves at Palisades Reservoir, Idaho

Heather Wilson, Russell Daines (Mentor), Mark Lovell (Mentor)

Blowout Canyon is named for a rock avalanche that occurred on the eastern side of Palisades Reservoir, Idaho where a headwall of a glacial cirque collapsed, possibly following an earthquake. The headwall consists mostly of west-dipping beds of the Mission Canyon and Lodgepole Limestone overlying a west-dipping fault, which may have caused an earthquake. The rock avalanche first moved northward into the north wall of the canyon and then was deflected westward down the length of the canyon. The total length of the rock avalanche is approximately 6 km and 0.2 to 0.8 km wide. Based on the age of an immature soil deposited in the lower canyon and of the Snake River terrace that the deposit rests on, the rock avalanche is estimated to range from a few thousand to a maximum of 15,000 years old (Walker 1964 and Moore, Woodward, and Oriel 1984). Using GIS software and equations from Wieczorek , Jakob , Motyka , Zirnheld , and Craw (2003), I will calculate the volume and the dimensions of the rock avalanche to estimate the height of the waves generated. Computational fluid dynamics (CFD) will be used to create a model of rock-avalanche-generated waves. This will show if rock-avalanche-generated waves could breach the Palisades Dam.
Catalytic Colorimetric Detection Using Aptamer and Gold Nanoparticles

Kevin Muller, Bert Huttanas, Jeunghoon Lee

Gold nanoparticles, functionalized with DNA, are promising candidates for a relatively easy detection of target DNA based on their ability to aggregate in the presence of a target strand, causing a shift in their surface plasmon resonance resulting in a detectable change in color. We have set up a system for catalytic detection of an arbitrary target DNA sequence using hairpin DNA and a linker:target complex, both of which have been attached to gold nanoparticles. This should improve the sensitivity of the DNA functionalized gold nanoparticle detection system. Also, in demonstration of the expandability of this system, we have used a hairpin aptamer initiator that binds to adenosine in order to initiate the same catalytic system. These systems can potentially be easily modified to test for a large variety of specific DNA sequences or organic molecules. We expect that this system will prove to be more sensitive than non-catalytic gold nanoparticle aggregation mechanisms.

Is it worth the Money?

Sarah Solano, Scott Lutz (Mentor)

My presentation will be on my internship at Technology Service Corporation, a company that deals with satellite tracking and trajectory. My objectives included setting up Monte Carlo runs for MVS to generate a trajectory for a comparison study. After generating this data, using MVS, I created 6 different noise level data variations ranging from not noisy to extremely noisy. I then ran this data through 3 programs: Matlab, MVS, and GFP for comparison. The Matlab data was not following the expected random scatter plot and it was decided to not include those findings until the bug was found. The second comparison was MVS vs. GFP, MVS being a more physics based and GFP being more data driven program. The conclusions were that the difference in their accuracy was minuscule for the most part, but that it could be seen that GFP more accurately represented the acceleration in most all cases.

Growth Functions of Finitely Generated Algebras

Kelsey Wells, Eric Nelson, Eric Fredette, Daniel Kubala, Harold Ellingsen

At a summer REU program in New York, my group studied the growth of finitely generated, finitely presented two-generator monomial algebras. In particular we tried to improve an upper bound found by our Advisor. A conversation with a visiting professor led to a connection to de Bruijn graphs and a drastically improved bound.

Co-Circular Kite Central Configurations in the Four-Body Problem

Tasheena Barrett

A central configuration is defined as a system of masses in which the gravitational acceleration vectors point toward the center of mass and are proportional to the displacement vectors from the center of mass with the same proportionality constant. Central configurations play an important role in the study of the Newtonian n-body problem because from these it is possible to construct explicit solutions. We consider a special case of the 4-body problem, specifically the co-circular kite. This special case of the 4-body problem can also be used to construct examples of 5-body configurations. Central configurations can be described using a system of polynomial equations called the Albouy-Chenciner equations. When using techniques from computational algebraic geometry on these equations, it appears that the exponents of the univariate elimination polynomials are multiples of three and the polynomials can be factored into perfect squares. We study the algebraic patterns in the elimination polynomials that occur in this special case.
**Geometric Group Theory**

Lise Deal, Ben Woodruff (Mentor)

For my senior project I studied geometric group theory. One area of focus was Cayley graphs, a way to graphically show the structure of a group as related to its generators. There are many possible Cayley graphs that could accurately describe each group. Most differences arise from the number of generators chosen to represent a graph and from variances in layout. I explored how Cayley graphs are useful for creating isomorphisms and locating subgroups. One other important aspect of any Cayley graph of n generators is that it is a quotient group of the free group of rank n. This applies to growth function of groups, or how quickly they spread. Current research into geometric group theory is heavily concentrated on what the growth function of a group's Cayley graph means about it's structure.

**Exercise of heat-treating an age-hardened aluminum**

Brad Plummer, David Johnson (Mentor)

A set of age hardened cast aluminum motorcycle wheels was obtained and powder-coated. It is common for wheels to be powder-coated, but involves elevated temperatures. This may cause the material to suffer degradation of mechanical properties with application of the additional heat-treating from the powder-coating process. Powder-coating process may alter the ultimate tensile strength, and yield strength. To investigate this, material properties of the original heat-treated specimen, and post-powder-coated specimen are investigated by experimental, analytical, and numerical methods. It was found that heat-treating through the powder-coating process reduced strengths by approximately two thirds of the original strength properties.

**Extraction of Supplemental Beta-carotene For Light-Dependent Nitrogen Fixation**

Jon Meyers, Skyler Hebdon, Parker Crandall, Shane Ruebush (Mentor)

Diazotrophs hold an essential role in modern agriculture as nitrogen fixing bacteria, using carbohydrates as fuel and releasing ammonia into the soil. We are in the process of developing a method to increase the output of fixed nitrogen with a lower concentration of glucose by genetically altering Azotobacter vinelandii to perform phototrophy of ammonia with the addition of a proteorhodopsin (PR) gene. This protein is a retinal-dependent macromolecule that catalyzes a proton gradient across the cell membrane. To functionalize the PR protein, A. vinelandii will eventually need to be genetically enhanced to perform the entire isoprenoid synthesis pathway. To test our methods, we will start by inserting plasmid DNA containing the PR and blh genes that will produce and bind retinal in the PR, provided that beta-carotene is present in the cell. We designed and carried out a procedure to extract the necessary beta-carotene from garden carrots through filtration and column chromatography. The extract was analyzed using IR, UV-vis, and Mass Spectrometry to identify beta-carotene and assess the purity the percent recovery. This extract will be fed to the engineered recombinant clones.

**Modeling a Tesla Valve**

Nathan West, Russell Daines (Mentor)

In 1916 Nikola Tesla patented a device with no moving parts that he claimed would block flow in one direction, while allowing it to pass freely in the other. This presentation describes the efforts of using Computational Fluid Dynamics to determine the validity of this claim by modeling the device and simulating it. It was found that after steady state conditions had been reached, the device seemed to function as described.
What does a picture sound like?

James Barrett, David Stowell (Mentor)

Frequency analysis is an important tool in modern image and signal processing. In this project we present a method to relate frequencies in a digital image to frequencies in a digital signal. In particular, this method maps each pixel value in an image to a frequency component in an audio signal. In this way one can actually hear the image. Various examples are presented. Such a method could have important applications in providing an alternative way of sight to those with visual impairment.

Population Migration: A Markov Chain Analysis using Economic Factors

Daniel Watkins, Mitchell Breinholt, Dave Brown (Mentor)

Effectively predicting population migration is an open question that has been approached from a variety of scientific angles. We approached the problem using econometric modeling techniques to understand the relationship between economic variables and intra-US migration. We hypothesized that economic factors including state GDP, housing costs, unemployment as well as environmental factors such as weather patterns are significant drivers of population movement. Markov chain analysis can be used to estimate the year to year change in the population of different US regions. Our model uses a linear regression of the indicators above to estimate the transition probabilities for the Markov transition matrix.

Computational study of Pinene derived hydroxy-peroxy radical-water complexes

Kathleen A. Gienger, Glenn E. Mumford, Lauren Holden, Jaron C. Hansen, Ryan DaBell (Mentor)

Pinenes are a class of unsaturated, bicyclic hydrocarbons found in plants, turpentine, and the atmosphere due to biogenic emission. The double bond in the pinenes is subject to attack from hydroxyl radicals (HO•) in the atmosphere, which subsequently leads to the addition of O2 on the adjacent carbon. The resulting hydrox-peroxy pinene radical belongs to a class of radicals suspected in a variety of atmospheric chemistry processes, such as the formation of tropospheric ozone and NOx. Moreover, when complexed with water, the resulting hydrogen bonding is thought to increase the overall stability of the system, increasing the availability of the species for atmospheric processes. In this study, we examine the thermochemical properties of the lowest energy conformations of the radical-water complex originating from various pinene conformers. ΔG, ΔH, ΔS, and the equilibrium constant are determined to help us to better understand the strength of the bonds formed in the complex.
Combinational PCR to Produce a Flexible Introductory Gel Electrophoresis Genotyping Lab Exercise

Tess Smedley-Rasmussen, Steven Christenson (Mentor)

Preparing and analyzing gels is an important and often used skill in the molecular laboratory. BYU-Idaho’s Introduction to Biology for Majors, students participate in a gel electrophoresis lab where they use a commercially available kit to prepare agarose gels and analyze a set of simulated forensic genotype samples. Commercial kits are ideal in their ease of use but can be expensive and limit the variety of samples and scenarios that can be presented to the class. Our objective was to design a set of PCR primers that could be used in a combinatorial approach to allow greater flexibility and creativity in the design of laboratory genotyping activities. Here we report the parameters and strategies for primer design, demonstrate the successful combinatorial amplification of varied genotypes, and describe several possible scenarios for application in the introductory lab setting. A cost savings analysis over commercial kits is also provided. In addition, the design and verification of the combinatorial primer systems can serve as an affordable, independent research project for upper division genetics or molecular biology students.

Learn to analyze SDS-PAGE Gels

Rikke Kristensen, Rachel Beck, Steven Christenson (Mentor)

It has become apparent that students have a hard time reading and analyzing SDS-PAGE gels. What is SDS-PAGE? Well, it is a process of running proteins through a gel to separate them by size. It is used to analyze the proteins and compare them to one another as well as to a standard. To help students further their understanding and ability we have devised a series of six worksheets covering different aspects to help walk students through the process. These include the five parameters governing the rate of migration, comparing the lanes to a standard marker, how the concentration of protein affects the intensity on the gel, how size of the protein is related to the distance traveled, staining techniques and how they aid in reading the gels, and lastly the application and interpretation of what was read on the gel. Each of these pages will have some information presented as well as scaffolded problems to help the students practice what they learned. At the end of all of these worksheets there are two pages of practice problems that require more thought and have less scaffolding to help facilitate student understanding of the concepts covered. The ultimate goal of these worksheets is to increase student understanding of how to read and analyze SDS-PAGE gels. By working through each of these worksheets, students will gain a greater understanding of what they are looking at and why they are looking at it. As future educators we are always looking to find creative ways to present scientific information that can potentially seem boring to students. We want to facilitate learning and understanding, but also make this process simple and enjoyable. These worksheets are our way of presenting information on a student’s level so they can learn to enjoy this process as much as we do.

Using Visuals as an Aid to Learning

Anna Nielsen, Hector Becerril (Mentor)

Chemistry professors spend many hours teaching the same basic techniques for laboratory procedures to students every semester. In order to save time for both the students and teachers, we are developing a series of videos to teach these techniques. This will provide not only unlimited repetition but also a visual aid to all students as they learn increasingly complicated skills.
Video substitute for in-class math review for BIO 377

Jedediah Knight, Scott Lindquist, Steven Christenson (Mentor)

Biology students will typically take the math courses required for their major early in their college career. Thus, by the time a student takes BIO 377, they are likely to be 2-3 or more semesters away from their most recent math course. For students who have served missions, it may have been over two years since they have performed some of the calculations used in BIO 377 on a regular basis. The math review day is a good way to refresh students on some algebra techniques and to introduce them to new formulas they will use commonly throughout the semester and their careers as Biologists. This video is intended as a substitute for in-class review of the Michaelis-Menton equation and Beer’s law. Benefits of utilizing a video for review as opposed to class time freeing up time for students to perform labs and allowing students to be self-paced in their review. While not intended to be a formal introduction to the concepts discussed, it is an effective means by which students can refresh their math skills and recall important equations commonly used.
**Major Facts Research Project**

Carson Grover, James Eisert, AJ Buruca, Betsy Tracy, Lacey Larson

*Our Meta Question*  In what ways do students at BYU-Idaho use and value the Academic Discovery Center major comparison tool?  

*How We Propose to Answer that Question*  

The Academic Discovery Center is launching a new software tool that will allow students to compare different majors in a variety of different categories such as starting salary, demand for a particular major etc. This tool is designed to help aid students in picking a major as well as give them a realistic overview on different aspects of majors based on empirical data. The Discovery Center is launching an awareness campaign to let students know about this new tool. Our job will be to beta test this new software and find out what ways students use and value it so we can provide feedback that can be used to develop an effective marketing campaign that will encourage other students to use it. We decided that the best approach for this type of study would be qualitative. Our idea was to conduct either a focus group or a series of in depth interviews where we could ask students about their experience in testing the software. Our findings would provide direction for an awareness campaign to promote the new software.  

*Where We Got the Idea for this Study*  

We got the idea for this study by talking to the research department in the I-Comm Advertising Agency. They needed to conduct research for this project and gave us permission to do it. Our findings will aid in the advertising campaign that will be carried out by the I-Comm Ad Agency.

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**Family and Consumer Science 4-H Day Camp**

Sarah Haskin, Jerica Hurst, Stephanie Little, Katie Nash, Katie Hagen, Megan Pettersson, Robyn Wright, Keesha McBride, SarahJo Gibson, Cheryl Empey (Mentor)

*We are Family and Consumer Sciences Education majors in HFED 380 (Connecting Education and Employment). Our degree incorporates a broad spectrum of life skills including but not limited to: Foods and Nutrition, Child Development, Clothing Construction, Finance, Home and Family Management, and Interior Design. Within our program we study Professional Technical Education and its incorporation into the education system. As a class we organized and implemented a service learning experience with Madison County for the 4-H Extension Program. Together we reached out to the local youth ages 5-18 by providing a “Fall Ball” themed day camp. In preparation for this day camp we created lesson plans, activities, obtained outside funds, followed a budget, and collaborated with the local 4-H coordinator. Activities complemented the theme of “Fall Ball” and our goal was to create age appropriate, fun and exciting projects. These included: gratitude journals, homemade bouncy balls, picture frames, candy apples, as well as fun interactive games. These activities allowed the children to learn about measuring, following a recipe, cooperation, and expressing their creativity. One of the main reasons we chose to organize a 4-H day camp was because we are potential FCS Extension Agents wanting to gain experience within the 4-H program. Some of the important lessons we took away from this experience are: community partnerships, leadership positions, youth involvement, teaching opportunities, networking, and committee participation. This day camp allowed us to not only learn firsthand what being a 4-H coordinator would be like but gave us the opportunity to use the skills we have gained as Family and Consumer Sciences majors.*
Handheld devices and Academic Performance

Adrianna Teerlink, Camron Hammond, Roberto Arias, Mark McCann, Benjamin Adams

We have gathered data for our topic by sending online surveys to a random selection of students from Brigham Young University-Idaho. We asked questions regarding the person’s demographic as well as questions directly pertaining to our topic. We are currently in the process of gathering the data and deriving quantifiable data from it. The following are questions that we hope to answer once all the responses are collected and analyzed:
1. What percent of students have smart phones?
2. What smart phones do students have?
3. How many students use their phones in class?
4. How many students use their phones even when told not to?
5. How much time in class do students use their phones?
6. When they do use them, what are they using them for?
7. Do students feel that their cell phones are a distraction in class?
8. Is there a correlation between phone use and a student's academic performance?

Aside from answering the above questions, we would also like to profile the students. By collecting basic demographics, we plan to look for any correlation between their personal attributes and the kind of device that they have.

Cause Marketing vs. Traditional Advertising

Stephen Flanders, Carly Calder, Jesse Kempler, Rachel Kempler

Held two focus groups on campus to find out if cause marketing is more or less effective than traditional advertising. The reasons behind the effects of cause marketing were also researched.

Taking Advantage of Texting

Amilya Craven, Amanda Parkinson, Curtis Spear, Becca Ray

Are young, single and socially anxious mobile phone users predisposed to recognize and take advantage of the social functionality of texting? In the study, The expressive and conversational affordances of mobile messaging, done by Fraser J.M. Reid and Donna J. Reid at the University of Plymouth School of Psychology in 2007, the results show, “...That young, single, and socially anxious mobile phone users are predisposed to recognize and take advantage of the social functionality of SMS to enrich their personal relationships.” In order to verify these results we will duplicate the study using the sample group of BYU-Idaho students, using the same survey questions.

Communication on Sensitive Topics Between Married Men and Women

Rebecca Moore, Jenny Bourne, Brooke Koster, Kjirstin Kinman, Jenny Bullock, Lane Williams (Mentor)

In this study we conducted two focus groups. One with married men, and one with married women. Within each group we asked them to rank on a scale of 1-7 how comfortable they were with the following topics: sex, contraceptives, child planning, spouse working, money, past lives and failures. Then, after they had written down their answers, we had each of them speak about what they had responded. We asked what topics were the easiest and why, what topics were the most difficult and why, and how has that changed from before they were married. After the specific questions, they were given the option to add any additional insights and discuss their opinions. We saw significantly different responses on what topics were difficult to discuss from men to women. The women all seemed to agree with each other on what was difficult, and showed approval when another would mention similar problems or success. The men voiced a certain amount of camaraderie, even though none knew each other prior, because they also seemed to have similar thoughts on communication within their marriage. However we noticed that even when they had different topics that they were more or less comfortable with, they all had similar responses as to why those topics were difficult or easy.
Preparation for Meaningful Employment

Arianna Mevs, Adam Farnes, Aubrey Buttars, Bryson Smith

Using survey methods, we will be asking a random population of BYU-Idaho junior and senior students from various academic departments how well they feel they are being prepared to obtain meaningful employment in their field of study after graduation. We will also be surveying a random population of faculty members from the same academic departments and asking them how they feel they personally are preparing their students, how their department is preparing the students and how the university in general is preparing students to obtain meaningful employment after graduation. We anticipate that these results will help give academic departments across campus feedback on their strengths and areas they can improve.

Career Preparation by Academic Departments

Arianna Mevs, Adam Farnes, Aubrey Buttars, Bryson Smith

1. The population for the research will consist of junior and senior students at BYU-Idaho, both male and female, who are pursuing degrees in all majors currently offered through the university. Another population will include full-time faculty members of academic departments on campus. A list of this population will be obtained from Brother Bergstrom in the Office of Institutional Research. 50 students that meet the previous description will be requested from each major. Probability sampling will be utilized to obtain this population. Because of the process of how the population will be obtained and researched, there will be control over sampling error.

2. Qualitative research methods will be used. A survey will be created and directed towards the total population. The survey will pose questions that, when answered, will address the specifics about those taking the survey (gender, year in school, major, etc) and will reveal how well students feel they are being prepared for the workforce by their professors, course offerings and opportunities to receive applicable experience. A separate survey will be created and distributed to faculty members of academic departments at BYU-Idaho. Questions posed will offer information about which academic department the professor teaches in, how many years they have been teaching, and how they feel they personally are preparing their students for meaningful employment after graduation as well as how they feel their department and courses offered are doing so.

3. Through random sampling of the student body, the results will be condensed to provide a general consensus as well as be sorted into various majors to provide individual results.

4. The research is not externally valid because the research only applies to BYU-Idaho and the academic perceptions of it.

5. No experiment will be used in this research, just a survey and applicable secondary research.

6. Ratio measurement will be used in the research. For example, a question on the survey might appear as follows, “How prepared do you feel to enter the workforce on a scale from 1 to 10? 1 being not prepared and 10 being extremely prepared.”

7. The nature of the research design limits the possibility of there being any ethical problems. However, it will be important that the focus group is handled by the mediator objectively and the environment is maintained as one where participants can express freely while maintaining professionalism. A common problem that could occur while using student emails, is lack of confidentiality. It will need to be insured that all emails are a BCC and will only be sent for the research purpose. If this is neglected, respondents may be hesitant to reply because of association of responses with correlating email.

8. Neither longitudinal research or content analysis will be used.

9. Qualtrics, a survey builder, will be used to gather survey data. This survey tool also provides the option to easily compile results in any way desired.
Media and the Effect on Interpersonal and Social Interactions

Amanda Mullinax, Jordan Christensen, Scott Hulme, Jacquelyn Temple, David Horner

Media and the effect it has on society has been discussed multiple times. This study set out to find if society is really influenced by what they see in the media. The meta-question for the project is: How does television viewing and other media affect interpersonal interactions? To see if, and to what extent, media affects social and interpersonal relationships, a survey was sent out to 200 Brigham Young University – Idaho students with questions asking how the participant would handle the situation in their own lives. The survey also asks participants how much television, video games and other forms of media they consume a day in hours. We asked a series of questions about how the participant feels after consuming certain types of media. We came up with good, better and best answers for each situation we posed by reviewing an interpersonal communication textbook and referencing the knowledge we gained from the class.
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Higher Test Scores Achieved by Students who Learn Physics for the “Big-Picture”

Sarah Young, Brian Pyper (Mentor)

Many times non-science majors in a physics class are panicked at the prospect of applying mathematics to the world around them. This leads to students falling back on short-term memorization of equations while achieving little true comprehension. By comparing beginning physics students’ answers on the EBAPS (Epistemological Beliefs Assessment for the Physical Sciences) to how well they scored on a physics 106 pre-test, we were able to find a positive correlation between high scores on the conceptual test and a belief in learning the big-picture of science. In other words, students who found it important to fit equations and individual facts into an overarching framework scored higher on the conceptual test. In addition, higher scores were achieved by those who relate physics material to the world around them, and also by those who believe an understanding of physics is based on hard work, not natural ability. These ideas about how students learn can impact the way instructors teach in a number of ways: building equations into a framework, showing real-world examples to the students, and asking non-discipline specific questions are just a few ways to help students better understand and embrace physics.

Privatizing India's Education

Betsy Petersen

Dramatic changes in the enrollment and attendance of India’s schools have altered the quality of education and in order to see the intended effects of more children in school, adjustments must be made. This paper includes a background of the education system in India, with examples from areas that have seen positive changes to their education system as well as an analysis of recent public policies and their impact on Indian education. Potential solutions are proposed for India’s Department of School Education and Literacy, with brief explanations of the advantages and disadvantages of each option. Possible policy options include the decision to do nothing, reshape the organization of public schools to resemble private schools, or completely privatize public schools. This exploration of policy options leads to an understanding that decentralizing the organization of public education, without reaching complete privatization, would enable schools the adaptability and mobility of efficient and localized organization while still maintaining government support.
Eliminating Borders Through Long Distance Instruction in Music

Kelsie Sullivan, Tyler Carlisle, Brandon Bascom (Mentor)

Long distance instruction in music, focused in piano, has many benefits including working with specialists, having no limits on location, real time performance, and no limitations from everyday life (i.e. weather, sickness, vacation, etc.). The software we have researched is user friendly, economical, and applicable to common occurrences in the music world. The methods used in the research of long-distance music instruction included four key elements: connecting two pianos over the internet, using MIDI connecting software (Internet MIDI), video conferencing software (Skype), and music notation software (Classroom Maestro). What is played by one user and is heard and seen in real-time by the other user. The capability of this technology allows for long-distance instruction to occur. There are no longer limits impeding the student/teacher relationship. Borders and locations are no longer relevant. There are many people teaching lessons via the internet with video conferencing software. The differences that this technology allows are to not only to connect through sight, but also to connect the instruments over the internet. This allows for instruction with a virtual music smart-board that can display what either user is playing in real time. Results vary within each setting based on the knowledge, maturity level, and teacher’s experience. A pivotal result is that students are able to work with any instructor from around the world. Home environments and influences of general life, such as sickness or weather, no longer inhibit instruction. This technology is readily available and provides opportunities that otherwise would not be accessible. This technology provides opportunities that are irreplaceable and specific to each student. Their growth is no longer limited by location and teacher experience.

Staying involved in STEM

Lauren Holden, Brooke McKenna (Mentor)

Science, technology, engineering and mathematics (STEM) are critical disciplines required for advances in society. However, it is difficult to get our youth involved in these fields. By teaching STEM in a way that makes it accessible and useful for students, we can cultivate their desire to pursue careers within these fields.

Are all of the 'interruptions' impacting our ability to work through long-term problems?"

Megan Marsden

There are many important decisions to make in our lives, especially during our young adult years. However we are sometime more lazy and reliant on others to make the decisions for us, or may take the easy way out. I believe we can maximize our abilities to work through problems as we minimize the ‘interruptions’ in our lives which come from negative thinking, mixed up priorities, and not taking responsibility.

Cognitive Overload

Matthew Urick

No abstract provided.
What do you think?: Critical Reflection and the Ponder/Prove step of the BYU-Idaho Learning Model

Andrew Kemp, Karen Holt (Mentor)

Professor Karen Holt and I conducted a qualitative assessment of Step Three: Ponder/Prove of the BYU-Idaho Learning Model to discover students' experience with reflection. Our investigation took place on BYU-Idaho’s campus across several semesters, in a variety of classroom settings, including business, religion, horticulture, literature, and education. Five students and one teacher were interviewed, and 46 reflective papers coded, as part of an update to Professor Holt’s 2006 dissertation case study. Much like her 2006 findings, our 2012 findings suggest that we were able to “label the students’ experiences, but not fully capture the process. It did not reflect the sequence the students seemed to be telling us was part of their experience with critical reflection” (Holt 132).

Students shared with us consistently their satisfaction with their classes, and how their teachers were getting them to think about the lessons outside of class. In several artifacts and interviews, we got a detailed account of a critical reflection experience, but often the general consensus can be paraphrased as “I’m a changed person, and I’ve got new skills to work towards my new goals. Either I’ve changed my major, or I’m changing schools, but I enjoyed the time I spent in this class.” While students shared with us their final classroom reflections, further research is required to understand the process that helped them reach their end goal. We know students critically reflect every day, consciously and subconsciously. This research shows that students actively participate in the Ponder/Prove step of the BYU-Idaho Learning Model, often without a deliberate awareness, as evidenced through the artifacts gathered from Business Management and English composition classes. We know students’ are applying the knowledge they learn in classrooms, whether it’s noticeable or more subtle. Further research will be required to discover the process they go through to get to that application.
The Iraqi Disarmament Crisis: The Cause and It's Effects

Neal Daniels

In “The Iraqi Disarmament Crisis: the Cause and It’s Effects”, the Iraqi disarmament crisis is briefly introduced, stating what the U.N. inspectors were looking for and why such inspections were considered significant. The essay then goes on to explain the basic history of the Gulf War, regarding its cause and why the U.N. and the United States were involved. A connection is also made between weapons of mass destruction being in Iraq and why it was a great concern for the U.N. and America before and after the war. Then, the essay goes on to discuss the temporal results of the inspections and how the Iraqi government interfered with the inspections. When the Iraqi government’s requests were accepted, they severely limited the inspections effectiveness, making it easier for the Iraqi government to hide and produce WMDs. After discussing these obstacles and the halt to inspections in 1998, the following paragraphs depict the diversity of results from this regulation against Iraq and how these conclusions were reached. Some state that the inspections did affect the Iraqi weapons program while others say that it didn’t. One expresses the concept that the inspections were one of the several factors that pushed Saddam Hussein to support and eventually lead terrorists. After touching on these diverse opinions, the uncertainty of Iraq is mentioned and concludes in stating that Iraqi WMDs will be left in the charge of the next Iraqi leader. (237) Keywords: Weapons of Mass Destruction (WMDs), Iraqi disarmament crisis, UNSCOM

Mexico's Drug War and the Narco States

Jorge Luis, Jeremy Lamoreaux (Mentor)

This paper outlines the origins of Mexico’s Drug War by offering a historical account that explains how America’s drug addiction has empowered Drug Cartels to establish a regime of terror that has lasted 20 years and claimed 72,000 lives. In order to fully understand this conflict; the notion of a simple two-front war must be eliminated. This is a five-front war composed by four of Mexico’s largest drug cartels fighting each other to gain control over the border routes that lead to the lucrative U.S. market; while at the same time the Mexican Army confronts all of them. The inhospitable nature of the 2,000 mile U.S/Mexican border limits the ability of government agencies from both countries to cooperate in order to deter the violence and the trafficking of drugs and weapons. Nevertheless, the inefficiency of both governments has reached the point that 90% of the weaponry utilized by drug cartels is obtained from U.S suppliers and 85% of marijuana imports to the U.S come from Mexico (DEA, 2011). Additionally, as a result of the absence of inter-governmental cooperation all major Mexican drug Cartels have more reach and capability to operate within U.S territory than Al-Qaeda; enabling them to become the most tangible threat to American National Security at the moment(Zabludovsky, 2012). Both governments have attempted to restore peace and the rule of law by the use of force. A total of 50,000 troops have been deployed to all major Mexican border cities and $2 billion has been provided in foreign aid for intelligence operations over the past decade. This has led to the exponential increase of casualties considering that they have quadrupled during this time frame. The major predicament with these measures is the fact that they are aimed at counteracting the violence and not the roots of this terror. As a conclusion for this research project, a permanent solution (aimed at eradicating the source of the conflict) that combines the best military and legislative efforts of both nations will be proposed.
Does the Christian world view in our country influence attitudes towards gay marriage and why?

Javon Collins

The vast majority of Americans (76%) identify themselves as Christians, mostly Protestant and Catholic. Key research and theories indicate that marriage is transitioning from the Christian notion of "sanctity of marriage" vs. the socioeconomic view of the "valorization of individualism". There also exists evidence which shows that Christian views vs. Gay rights views do not conflict but overlook each other entirely. This study will analyze the deeper reasons why Christians tend to have negative attitudes towards gay marriage and the implications therein. The null hypothesis for this question is that there is no relationship between having a Christian world view and attitudes towards Gay Marriage. The alternative hypothesis is that there is a relationship - I will test these hypotheses using data collected from the General Social Survey Cross-Section and Panel Combined (GSS). Data are collected on religiosity as well as various prevailing attitudes towards sexuality activity among same-sex couples. This study reveals that there is a direct correlation with those who (within their varying degrees) practice Christianity and their subsequent views towards gay marriage. Most importantly, the explanations of why intolerance prevails and their true causal relationships are expanded upon – in conjunction with prior research. This research aims to shed further light at the existing paradigms within marriage. Most importantly to ask the question, “should marriage be exempt from all human beings who cannot fit a particular “family” classification or meaning?” – whether gay or not. Or, should a sort of social solidarity prevail that allows for marriage to transcend the myriad of beliefs that creates for it, an ambiguous definition. The purpose of this study is to help alleviate any misunderstandings and bias’s that may exist on this matter and to move forward as society comes to a more pragmatic understanding of the current underlying issues regarding gay marriage.

Christianity and Racism

Marrott Audra

In the past, Christianity has been used as a justification for racism. It began with the belief of the separation of “God’s people” from sinners. While there may be much information to research on both the subject of racism and Christianity, it seems that little in the way of empirical evidence has been conducted collected on these subjects. This is important to study with the understanding that true Christian principles do not support being Racist, rather than trying to find some sort of justification in Christian beliefs for racial intolerance. It is also important that the distraction of political and cultural beliefs be isolated. Interviews were conducted using the NORC standard questionnaire. The General Social Survey spans from 1972 through 2010. Subjects were asked to indicate their religious preference and they were also asked a few questions to test their views on those of a different race to determine their level of racism. The null hypothesis for this question is that there is no relationship between Christianity and racism. The alternative hypothesis is that there is a relationship. Currently I am awaiting my results, which will be given in my presentation.
Saudi Arabian Economic Diversification

Jarom Robertson

This paper analyzes the effects of oil on the Saudi Arabian economy. Oil has brought incredible wealth into Saudi Arabia and has helped to significantly develop the nation over the proceeding decades. While this has been an incredible achievement for an otherwise resource poor nation, it is not wise for Saudi Arabia to remain so heavily reliant on oil. The market for oil is temperamental, creates undesirable side effects such as high inflation and unemployment, and will eventually cease to exist. In order to be ready for the day when oil stops sustaining the Saudi economy, Saudi Arabia must pursue a path toward economic diversification. Saudi Arabia has numerous examples to follow (such as the emirates of Dubai and Abu Dhabi) and has itself taken steps toward economic diversification such as investing in infrastructure, legal reform and market liberalization. However, in order to be completely successful in diversifying its economy, Saudi Arabia must undergo a campaign of cultural change to allow for foreign entities to enter into their society’s daily life. It remains to be seen if it can accomplish this task, but if Saudi Arabia is successful they will continue to move toward becoming a developed nation.

China’s Influence in Africa

Holly Hurst, Jeremy Lamoreaux (Mentor)

By the mid-20th century, colonization and the scramble for Africa came to an end. After these foreign powers withdrew their influence, a void was left in this newly independent continent. To fill this void, China stepped in as a great economic, and thereby political and social, influence. This paper examines the effects of the Washington and Beijing Consensus’ independently, and analyzes how effective these approaches to international aid have been in the African continent. China’s economic influence is also explored in the African continent, for better or for worse, and the response of the African leaders and people through an original case study conducted in Uganda.

Lost in Transition: Hong Kong’s Globalized Security Frontiers in the 21st Century

Timothy Ng, Samuel Ng

The year 2007 marked the 10th anniversary of Hong Kong’s handover from the U.K. to China, resulting inevitably in a plethora of fresh commentary and analysis on the region’s status since the historic governmental change. On the individual level, whether or not the general situation is perceived to be better or worse since ’97 remains a highly subjective matter of opinion. Yet, at least from an objective vantage point, Hong Kong’s socio-economic prosperity seems to be just as stable as ever, still topping the charts as the world’s freest economy for the 17th year running. Despite the nation’s economic success, however, many Hong Kong people feel they have lost some freedoms to the CCP, and thus feel confused about their identity as Hong Kongers. This has resulted in occasional outbursts of organized dissent to try to cling on to whatever abstract identity they feel is being, or has been, taken away. In reality, however, it could be argued that Hong Kong is more autonomous than ever before, but something else appears to have slipped away from the bustling Cantonese nation—triad activity has migrated not only across the border to the mainland north, but also to the North American and Western frontiers, creating a potent security dilemma for policy makers around the globe. Yet this is just one of several concerns requiring enhanced attention. Global health and cyber-security issues have even greater potential to disturb the peace in this unique gateway between the East and West. This essay analyzes and lends insight into some of the key hard and soft security issues of Hong Kong for the 21st century, evaluating how these might affect the Hong Kong identity and the regional and global politics as a whole.
Saudi Arabian Legal Code Development

Jarom Robertson

This paper analyzes the legal system of Saudi Arabia. It begins by demonstrating common frustrations with the Saudi legal system and reviews its historical background. The Saudi tie with Wahhabism is developed as a key reason for the country’s unwritten Sharia law. The consequences of the Saudi Arabian legal system include persons held without trial, prisoners tortured into confessions, trials held in secret, persons convicted without trial, lawyers being kept from clients, and crimes varying widely in determining punishments. The attempts to reform the Saudi legal system in 1992, 2001, and 2007 are evaluated with their strengths and weaknesses. The concept of judicial precedence is introduced as a viable solution to reform the Saudi legal code.
Can Heavy Metal Help You Lift Heavy Metal?

Todd Blair

The purpose of this study is to see how much and in what ways music influences your mind and body during exercise. My hypothesis is that fast tempo aggressive music will increase exercise performance both mentally and physically. As part of my study I will also factor in sex and music preference, as well as the effects of slow paced music and no music. I will collect my data by going to the Hart building gym where I will set up a table and post a sign asking for people to participate in a short research study. As well, I will attempt to recruit students from various weight lifting classes. In exchange for the subjects participation I will offer a protein bar or a Little Debbie’s Swiss Cake Roll to whoever will lend their time. After marking sex and music preference on a sheet of paper I will have the participant draw a number 1-3 from a hat assigning them to either the control group (no music), experimental A group (aggressive music) or experimental B group (slow paced music). Several MP3 players will be rented from the library and two mixes of music will be made which will be approximately 8 minutes apiece. One mix of music will have low key, slow tempo music and the other mix will have more aggressive quick tempo songs. I am not focusing on a particular sex or age group; I will collect data on anyone who is willing to participate who is eighteen or older and the hope is that I will be able to have at least 90 participants, around 30 for each category. After the 8 minutes are up participants will return to fill out a modified likert scale rating from 1-5 their strength, mood, focus, and stamina.

Effects of Extracurricular Involvement on Students GPA

Katrina Savens, Isaac Wutkee, Eric Gee (Mentor)

Are those that get involved in organizations on campus less likely to succeed intellectually in their classes? High grade point averages and “well rounded individuals” (which is usually defined as those involved in extracurricular events) are sought out more by schools and potential employers. With such pressure put on students for grades many believe that it is too hard to be involved while still achieving high marks in school. Some students wonder how they could ever find the time in their busy schedules to do both. Still, others believe that participation in extracurricular events motivates them more to succeed in their education. It is for these reasons that researchers have conducted many studies on the effects of involvement on one’s academic achievement. House (2000) found that students who were involved in extracurricular activities “showed slightly significant positive correlations” between their perceptions of their own academic capabilities and predictions of how they would do in school. Beyond the research conducted on the effect of involvement in extracurricular activities on student’s self-concepts (in turn, changing their academic achievement), other research has been done on this same topic, but with a different focus. Another study looked simply at one’s involvement and one’s academic achievement finding that grades improved due to one’s participation in high school (Camp, 1990). Our interest in doing this study was sparked by student leadership positions which we have the privilege of holding, but after looking into past studies we found that many did not look at how often students actually participated. However, we propose testing how long and how frequently students have participated in extracurricular events, looking to see if their GPA correlates positively. We feel that the amount of involvement would be worth looking into in order to see just how much of an effect it has on GPA and what a student should expect to put into extracurricular activities in order for their involvement to truly benefit their academics.
The Greenhouse Effect: Classroom foliage and student performance

Elliott Dennis, Eric Smerdon

Studies have shown that indoor plants provide many benefits including health and cognitive development. The purpose of this study is to investigate the effects of indoor plants on classroom performance in college students. The hypotheses is that if plants provide many benefits and help improve cognitive abilities then students placed in a classroom with plants will perform better than students placed in a room without plants; We expect students to have lower systolic blood pressure; and report greater satisfaction with their classroom experience. The participants will be students in psychology 201 classes; taught by Sister Roberts. Each class period will either be given one of two plants, or in the case of our control group, no plants at all. The students will be tested with tests prepared by teachers before plant placements and then re-tested after four weeks of plant presence or absence. The design is a non-randomized control group pretest-posttest design. The results will show that the students who receive the treatment of having plants will perform better on the posttests than the students in the control condition who will not have plants. Also that systolic blood pressure will go down and people will have greater satisfaction with the classroom. One limitation might be that the sample size is small and may not adequately reflect performance for all students exposed to plants. Since plants have shown to reduce stress and improve mood, future research could be done on the impact plants have on improving test taking abilities.

Memory Function in Relation to Emotional Stimuli

Lyndsey Duerden, Eric Gee (Mentor)

There are many demands placed on daily life, and we must manage to interact with and interpret our surroundings in order to successfully participate in society. I hypothesize that a positive emotional video clip, focused on happy and comfortable feelings, shown immediately after information has been introduced, will aid in recall of information more than a negative video clip focusing on sadness and depression will. Participants will be a convenience sample of BYU-Idaho students recruited in random courses across campus. Memory function will be tested by providing a list of words that need to be memorized and then later recalled. The participants will be randomly assigned into two groups (Group A or B) and a distracter survey will function as a control measure within each group. A one-way repeated measures analysis of variance (ANOVA) was used to analyze the data, and the original hypothesis was not supported. The conclusion is that there is a significant difference between having an emotional state present versus having a neutral setting during recall. The presence of an induced emotional state during recall improved memory function, but the type of emotion felt was not significant. These results imply that working memory performance should be improved when individuals are exposed to an emotional environment of any kind, positive or negative. This research in limited in regards to having a small sample size, and only testing one type of positive and negative emotion in a very specific sample population consisting of mainly Caucasian individuals between the ages of 18 and 25.
Using Phonetics for Language Acquisition and Pronunciation
Anna Hartvigsen, Elliott Dennis, Eric Gee (Mentor)

The purpose of this research is to understand the effects of studying phonetics on German language acquisition and pronunciation. It is hypothesized that participation in a German phonetics course will increase language acquisition and decrease foreign accent. The participants for this study included students from two classes of beginning German (GER 101) at Brigham Young University-Idaho. The participants were recruited in their classes to participate in a modified version of an already existing extra credit activity that encourages the practice of German in a conversation setting. Participants were asked to participate for half an hour in a German conversation group or phonetics course for four consecutive weeks. Following the four weeks, participants completed a fifteen question vocabulary quiz to assess language acquisition. The participants read a list of ten words and one sentence for their foreign accent to be rated by three raters on a five point Likert scale.

Advertisements and Body Image in Young Women
Shaina Tiritilli, Krystal Dunham, Eric Gee (Mentor)

The effects of advertisements on the body image and self-esteem of young women really is a hot topic in the media. Every day there’s another company or model under fire for creating unrealistic expectations for women to live up to physically. The women in these advertisements are beautiful and extremely thin to begin with, and on top of that they are typically Photo-shopped to make them even more so. The problem is, the research in this area has been extremely divided. There are studies supporting both sides of the argument. Some study results suggest that they do, in fact, have a negative effect on young women, while others suggest that there is no effect. This study uses a likert scale looking at the body-image of young adult women at BYU-Idaho. One group was given the questionnaire with no intervention, a second group was given the questionnaire after looking at an advertisement featuring an extremely thin model, and a third group was given the questionnaire after looking at an advertisement featuring a plus-size model. The questionnaires were then evaluated and compared to see if there was, in fact, a difference.

Involving undergraduates in exploratory research while teaching course curriculum
Michael Petty, Andrew Lowrey, Adam Mckee, Yohan Delton (Mentor)

“An ever-growing number of academics see undergraduate research as the pedagogy for the twenty-first century” (Dotterer, 2002). It has been shown that students with undergraduate research experience are twice as likely to pursue and complete a doctoral degree (Bauer & Bennett, 2003). However, demands on faculty, such as limited funding, heavy work load, and the time it takes to mentor undergraduates, limit their capacity to facilitate such research experience. We overcame these limitations by combining course curriculum (in this case an undergraduate Industrial/Organizational Psychology course) with a consulting research project. The aim of this project was twofold: (1) to give students a research opportunity in a consulting environment and (2) to support local businesses. We successfully combined course curriculum and research by using a selection process to organize the team, software (ASANA) to manage the team and track assigned tasks, university databases to conduct research, and connecting with workers in the community.
Children and Preference: Can Incentives Influence Gender Choice of A Friend?

Michelle Green, Eric Gee (Mentor)

Berk (2012), has found that children often gravitate toward things associated with their same gender. From toys to playmates, the rigidity of gender typing and social expectations deters many children from developing new friendships and experiences important for their maturation and development. The focus of this study was to see if a child’s gender preference of a friend could be altered using an incentive. The hypothesis defended the idea that the presence of an incentive would be enticing enough to alter the gender preference of friendship. Gender preference begins early in childhood where children learn from parents and peers and follow their examples. Benerjee (2000), suggests that gender stereotypes are further solidified when children are positively reinforced in these stereotypes by parents, peers, and others of influence. Discrimination between both boys and girls is prevalent during early childhood and can become more flexible, but as Mehta (2010) suggests, has been found to continue even into a child’s adolescent years. Studies have shown the prevalence of gender preferences and stereotypes among children but none were found to purposefully attempt to alter them. After gathering initial friendship preference, children were randomly assigned a set of videos depicting a boy and girl. In the control set, the videos only showed the boy and girl. In the experimental set, toys were used as the incentive to alter preference. The boy was playing with a toy typical of a girl and the girl was playing with a toy typical of a boy. After viewing one set of videos, children were asked which child they wanted to be friends with. Results of the study have not yet been run statistically, but hope that statistical significance will be reached given the presence of the toy.

A revisit to conformity: Value vs. Critical thinking with Religious Students

Elliott Dennis, Anna Hartvigsen, Spencer Davidson, Eric Gee (Mentor)

This idea is of particular interest to this study as Saroglou et al mentioned they do not conform to the norms of society. During our literature review, there have been few studies showing the relation between religion and ones resistance to conformity. In some studies, others have alluded to the fact that the Christian religion allows for people to be more self aware but none have been directed at the LDS population. In essence, the concept connecting all these studies is that moral or religious codes have an effect on a person’s behavior (Tittle & Welch, 1983). This study hopes to take into consideration these factors to along how people conform when confronted with a group of people who share religious beliefs. Hypothesis In light of the afore mentioned research on conformity and moral codes, this study aims to test whether members of the LDS, “Mormon”, religion who profess high religious devotion will conform less frequently than those with a more relaxed religious devotion. Participants There will be 40 participants taken from 2 different classes. All participants will be taken from classes that are mandatory for all students to take before receiving a diploma at Brigham Young University at Idaho. There will be three ways of collecting data in this experiment. One is the religiosity scale used to test peoples degree of religious devotion and another is the qualitative interview that is conducted with participants at random if they chose not to conform and all those that chose to conform at least once. Lastly, an authoritarian scale was taken in order to determine the degree to which people obey authority. This will be a cause and effect study with the results being analyzed by within group comparison MANOVA in SPSS. Procedure Participants were asked to complete the survey which was sent to their email within three days of it being sent. After the survey was completed, the participants were given 3 weeks before contacted again in order to sign up for a time to come in and participate in some group questioning as previously determined. Participants were asked to sign up every 5 minutes.
**Music and Precision: What the Sounds You Hear Do for Your Hands**

Rodger Hurst, Todd Blair, Eric Gee (Mentor)

Recently, much research has been devoted to discover exactly what music can do for us besides entertain. Much of the research has discovered that music helps individuals when performing various tasks. The purpose of this study is to further solidify that research, and determine specifically if music can aid average students from BYU-Idaho in a particular fine motor skills test. We hypothesized that listening to personal preference of music will help individuals’ performance of the test. The actual results did show that those who listened to their preferred style of music performed better than other groups on average, but did not quite demonstrate actual statistical significance. The results are suggestive, though, and should be investigated further in future research. We were limited in the scope and diversity of our samples, and in our ability to extrapolate our results to performance in actual careers. In the future, research could address those very issues, thus allowing us to see truly if music can aid us in our careers or other skills.
Microloans and Non-Profit Organizations
Kaeley Scruggs, Robert Brown (Mentor)

Abstract Microloans have been perceived as a likely remedy for poverty in the world. The Grameen bank has pioneered the idea and helped propel it into the attention of the world. A splendid idea has become somewhat distorted as people, namely businesses and banks, recognize that a profit can be made from giving out microloans to the poor. The major problems associated with banks giving out loans include the idea of making profits, interest rates, and becoming self-sustaining. Non-profit organizations are a better choice for facilitating microloans because their focus will always be helping the people.

Current Analysis of Rexburg Married Housing
Jared Chase, Rick Hirschi (Mentor)

My research provides an analysis of the Rexburg housing market, specifically the housing that is not Brigham Young University-Idaho approved. The research is particularly valuable to an investor who is interested in the Rexburg market and it provides valuable information regarding correlations between rental prices and the following categories: distance from BYU-Idaho, type of housing, number of amenities, and even whether or not pets are allowed. I cover both the supply and demand side of the market. The current supply has been thoroughly analyzed and the future demand will be covered as well based on predictions of economic growth, changes in mission ages, and past trends. With this research I can predict how much rent could be charged on a piece of property over the next 3-6 years and still have 100% occupancy based off of its location, number of amenities, and other factors that might surprise you.

Transitioning to Retirement: Finding Success Despite Challenges
Madison Horton, Janiel Nelson (Mentor)

While there are inevitably challenges and difficulties in the transition to retirement, they can be prevented and overcome through awareness and preparation. Multiple research studies were explored and the following pattern was clear. When one leaves the workplace, they find it is difficult to leave their accompanying identity behind in the workplace, as this is how they have been defined for many years; it is there they have a purpose and often a legacy. Therefore, it is essential to develop connections, hobbies, and relationships in other aspects of life. In retirement, it is necessary to stay actively involved with life and not stagnate if happiness is desired. Marriage and familial relationships are an important aspect of well-adjusted retirement. While some may argue that preparation for retirement is not necessary, this is a false notion and a smooth transition is desired.

Caretaking and the Elderly- Doomed to Deteriorate
Jessica Chandler

My research topic is “Caretaking and the Elderly”. From this topic I am focusing on the aspect of a caretaker being your absolute best option. The choices that are being presented to you in this essay are euthanasia, a nursing home, or a caretaker. It is a fact that a day will come when we will no longer be able to care for ourselves since our bodies abilities will be deteriorating. We will have to become dependent upon others in order to continue living and partaking of any life we have yet to live. From analyzing the choices the most appealing data to me was the caretaker. They will be the individual that is more required to have a singular, and invested interest in your well-being.
Retirement Planning
Erin Cattern

“According to the United States Census Bureau 80% of Americans, ages 30-54, believe that they will not have enough money put away for retirement” (US Census Bureau). I want to educate the young people of today about retirement planning and demonstrate how very important it is in our life today. There are so many different retirement plans, including IRA’s, ROTH IRA’s, and 401-k plans. All of these are great plans and come with different ways to plan retirement and how you are going to spend your money in retirement. In my research I found that most people don’t start planning for retirement until it is too late, and that is not acceptable when there are so many ways we are able to save money for retirement. By demonstrating the various ways you can plan for retirement I will ask that everyone sets up their retirement plan and what kind of IRA they would like to set up. I will also be asking my listeners to picture their life as a retired person. So many people think that retirement is a time you don’t have to work, get to vacation and just have a good time. But really it is a stressful time and you are constantly worrying about money, family and eventually death. Bringing my listeners down to reality will help them effectively consider how they would like to spend retirement. There are plenty of mistakes people make in retirement planning such as going out to eat all the time, thinking they have more money than they actually do, thinking they will never have to earn money again and many more things. I want to teach my listeners how to determine what is and is not important in retirement. Debt is a huge factor of retirement. When you go into retirement you should have very little or no debt. How are you supposed to pay off debt and not have an income? You can’t do it. So we will also discuss ways in which you can avoid large quantities of debt and how to pay them off quickly. A good way to still have an income in retirement, if you were to get to retirement and realize you didn’t save enough, is to open a small business or restaurant. Probably unlike your previous career, this requires more knowledge than physical work and is perfect for retirement.

How Socioeconomic Status Affects Health
Elisabeth Bowring, Tiff Jenson (Mentor)

Since the 1960’s in America, a poor health epidemic has been sweeping across the nation at alarming rates. It has become an issue of focus in the country to try and stop this from getting worse. There have been studies and reports on what factors cause for these health issues to arise. This study examines how socioeconomic status will affect a person’s health. Using the National Longitudinal Study of Adolescent Health (Add Health), 1994-2008, specifically focusing on Wave 4 of the data collected in 2008 (n=5,114). This study examined the adolescent’s transition into adulthood and inquired about a wide spectrum of aspects of their lives. Using a scale to include many questions pertaining to socioeconomic status and health, tests were done to see the relationship between socioeconomic status and health. The results of this study suggests that socioeconomic status and health do have a significant relationship to each other. With the results of this study, we can see what actions need to be taken to help those of lower socioeconomic statuses to improve their overall health. We can also use the information from this study to see what causes better health for those of higher socioeconomic statuses and apply those principles to those who struggle with poor health. If help is given to those with lower socioeconomic statuses, in turn, the national rates of poor health will finally decrease.
"From Victim to Abuser: The Developmental Process"

Amanda Lowder

This study focuses in on the cycle of sexual abuse and why this cycle happens. It theorizes the process of how a child who has been sexually abused may lead into the cycle of abusing others. Those who have been analyzed in this study are from all around the world. They are from a wide population who were randomly selected. Those who were identified as experiencing child sexual abuse were cross analyzed by those who were also sex abusers. This gave us the variables that represent those who are found in the cycle of abuse. We found that the correlation between those who are victims of child sexual abuse and those who are sex abusers is highly statistically significant. These findings move the facts of just merely knowing there is a correlation, but how one develops into a sex abuser. This can also help further researchers implement intervention tools.

How does Socioeconomic Status effect Delinquency and why?

Kendl Crockett

There are few articles containing data concerning the matter of the correlation of socioeconomic status and juvenile delinquency. I plan on contributing to these articles by giving my own research. The purpose of this study is to examine if there is a correlation between low socioeconomic status and Juvenile Delinquency and why. I purpose that those with low socioeconomic status will be at a higher risk of committing delinquent acts. I am using the data from the national study of youth and religion, wave 1.

A Study of the Impact of Educational Attainment on Criminal Activity Choice

Savannah Argyle, Tiffany Jenson (Mentor)

This study was conducted to see whether or not educational attainment impacts the type of criminal activity a criminal is involved in, specifically property crime. It is believed that those with higher education are more likely to commit property crime. The social strain theory is used to show how people are influenced by social structures and the labeling theory to commit crime. Data for this study is taken from the National Institute of Justice’s Evaluation of a Local Jail Training Program in Sacramento County, California conducted in 1994-1995. The variables used are educational attainment and criminal activity. Through specific variables taken from the data, it is shown whether or not they have a significant relationship, and if having a higher education does influence more property crime among criminals.

An Examination of the Influence of Peers and Juvenile Delinquency Using Symbolic Interactionism

Jill Nelson

Criminologists and sociologists have been studying relationships linked with juvenile delinquency for decades. Results have been contradictory in determining whether or not there is a positive or negative relationship between peers and juvenile delinquents. Data was taken from the National Longitudinal Study of Adolescent Health (Add Health) in which a sample of 27,000 adolescents attending high school in the United States were surveyed in a stratified random sample. This study will focus on the relationship between the involvement of peers and juvenile delinquency, and will explain the connection between the two using symbolic interactionism. Results of the study were statistically significant, and found that there is a relationship between amount of time spent with peers and a teens ranking on the juvenile delinquency scale. This study contributes to the contradictory nature of juvenile delinquency and peers and reiterates the connection between the two.
Adolescents committing delinquent acts; Personal problem or influential problem

Patrick Sager

The study will focus on parent-child relationships and how the relationship impacts whether or not an adolescent commits a delinquent act. It will determine if there is a relationship between these variables. The study will also take into account other factors that may influence the dependent and independent variables. Data was collected from wave two of the 1994-2008 National Longitudinal Study of Adolescent Health (Add Health) of 27,000 randomly sampled adolescents in the United States. A stratified, random sample utilized with high schools around the country with parameters of at least 30 students in eleventh grade insured that each school had an equal chance of being selected. The results indicate that there is a relationship between parent-child relationships and whether or not an adolescent commits a delinquent act. The results from the study will allow parent-child relationships and delinquency to be understood more fully, why regardless of peer influences, adolescents commit or do not commit delinquent acts. It will contribute to the already existing information, but it will explain in greater detail and the information will be updated and more modern.

How does exposure to media effect violent juvenile delinquency and why?

Jesse Sanders

This paper examines the association between media usage and violent behavior. The National Longitudinal study of Adolescent Health, Wave 2 (ADDHEALTH) from 1998 was the data set used for this study. With the increasing amount of time spent using differing forms of media, children are exposed to larger amounts of violence. Adolescents who view large amount of media are more likely to exhibit violent behavior. Suggestions and implications for future research will be discussed.

The Impact of Pornography on Sexual Violence

Madeline Streeter

The available literature is comprehensive regarding the influence of pornography’s effect on committing sexual violence. However, there are other unexplored and understudied areas of pornography use that have not yet been investigated. The use of pornography has exponentially increased, especially with the widespread access to the World Wide Web. This study uses data collected from the 1992 National Health and Social Life Survey to examine how viewing pornography affects the likelihood a person has committed sexual violence within adults (aged 18-59). Results suggested that a statistically significant relationship exists between the use of pornography and committing sexual violence. Ultimately, this work provides a deeper understanding of the social processes involved as the pornography industry develops and grows through prevalent usage of the Internet around the world.
Educating Our Parents

Niccol Hahn

Educating the students in America is something that has been evaluated time and again by presidency after presidency. Throughout history we have focused on the child and how to help them become better citizens and productive members of society. Yet, at the end of the day they go home to parents who stunt their educational potential. This paper is going to explain how education needs to focus more on creating parents who can teach in cooperation with teachers. Data from The National Center for Education Statistics will be analyzed to show how important it is to help the parents so they can help their children.

Do attitudes on cohabitation have an effect on divorce?

Dennis Henrich

This paper explores the relationship between attitudes on cohabitation and it’s correlation to divorce. Research from the General Social Survey (1972-2010) was used for the purposes of this study. When couples cohabit prior to marriage, they often times end their relationship in divorce. Those that have an accepting attitude for premarital cohabitation are more likely to get divorced than those that feel that it is wrong. Although there is much research on the correlation’s as to why divorce occurs, there is little research on whether the attitudes towards cohabitation are strongly correlated to divorce or not. The relationship between individual’s attitudes on cohabitation and eventual divorce is supported after analysis.

The Relationship between School and Home: How Emotional Abuse affects the Student

Alina Cash

This paper examines the relationship between a child being abused in the home and how that translates with their peers. Multiple sources were consulted, including peer reviewed articles, Child Protective Services (CPS) manuals, and informational source books on the psychological effects of child abuse. Children who experience emotional abuse and view forms of domestic abuse in the home are more likely to become bully-victims in school. Becoming a bully or a victim is dependent upon the type of emotional abuse and or domestic abuse and the coping strategies used by the child.

Education affects racial prejudice

Tracey Yamamoto

There have been incidents in history that show that different ethnic and racial backgrounds have had prejudice towards another. There is a relationship between how much education a person has to be prejudice or not. There are two different types of prejudice that can be applied to racial prejudice: blatant and subtle. Blatant is direct and subtle is indirect (Pettigrew 1998). Nora and Cabrera state that feelings of being discriminated and the size and ethnic composition of the person’s group affect a student’s educational performance (1996). Low education causes old-fashion racism, old fashion racism is blatant prejudice (Virtanen 1998). Higher education is the most important pressure that will reduce prejudice in the world in groups that had low education now. With this lack of research and the importance of education on racial prejudice it is important to add more research to solidify our knowledge the relationship between the two variables.
A Study of the Effects of Homosexuality on Religiosity

Garrett Allen

This paper examines the association between homosexuality and the effects that it has on an individual's religiosity. The National Longitudinal Study of Adolescent Health Wave 4 (Add Health) from 2008 was the data set used for this study. The typical homosexual individual will feel less welcome in many religious environments due to the teachings and values that are encouraged by that religious institution. Individuals who are not readily accepted in an institution are more likely to not have a regular relationship with that institution. Through the analysis, the relationship between homosexuality and religiosity was supported. Suggestions and implications for future research will be discussed.

The Impact of Adoption on Family Relationship Quality

Brian Tait, Ashley Evans (Mentor), Tiff Jenson (Mentor)

This paper looks at the association between being adopted and the family relationship quality using the National Survey of America’s Families, Wave 3 (NSAF) from 2002. Not all children live with their biological family after they are born. The family dynamics of having children who are your own flesh and blood are naturally different than those that adopt. Prior research has suggested that adopted adolescents struggle with behavioral problems. Adoptees have been put in a negative light because of where they came from and how they are acting now. This research will show the effects of adopting children within a family unit. Here we will see how healthy a family relationship is when you add an adopted child in the family. Results suggested that a statistically significant relationship exists between adoption and family relationship quality. Future couples who are not able to have children will continue to utilize adoption as a way of starting a family. Adoptive parents will want to continually understand the family dynamics of adopting children. As more and more adopt they will look for research in order to prepare themselves for what their family relationships will most likely be like.
How does religiosity affect marital satisfaction and why?

Donny Dayton

I examine the relationship between religiosity and marital satisfaction. I theorize the nature of this relationship through the lens of two sociological paradigms. Through Symbolic Interactionism I explain how one must gain a concept and develop a meaning of marriage; this is done through repeated interaction with one’s religion’s reading materials, lectures, ideals, and general teachings/doctrines. The second sociological paradigm I use to explain this supposed positive relationship is Rational Choice Theory. Once one gains a meaning of marriage, this understanding will largely determine one’s rationale and view of what choices/actions are most beneficial with regard to marriage. Once one gains a meaning of marriage, this meaning will greatly determine what is “rational” and most “beneficial” to this person. First one must gain a meaning of what marriage means; second, one will make rational choices that are in the best interest of self, which rationale will be affected by the meaning that was gained through interaction with their religion. Religiosity, the independent variable, is a scale/interval variable; marital satisfaction, the dependent variable, is a nominal variable. I created a scale for religiosity because of the multidimensional nature of religiosity. I recoded the marital satisfaction variable into just two categories (“Very Happy” and “Pretty Happy”)/“Not too Happy”) to make it a nominal variable. I test the nature of this relationship by running a binary logistic regression.

The effects of parental supervision on delinquent behavior

Joseph Sanchez

This study examines the effects of parental supervision on delinquency rates, providing further support for past research analyzing this relationship. Data was collected from the first wave of the National Study of Youth and Religion. In the early summer of 2002 a random-digit-dial telephone survey was used to interview youth and their parents. 3,370 cases were completed. In the summer of 2003 trained interviewers conducted personal interviews with 267 youth from this original telephone survey. Interviews consisted of discussions about the respondents religious, spiritual, family (including the amount of parental supervision), and social lives (including their involvement in delinquent activity). The results show a high level of significance indicating the strong inverse relationship between parental supervision and delinquency. An increase in parental supervision during the afternoon and evening has a major influence in lowering the amount of delinquent activity that the child is involved in. This study provides added support for past research on the topic and specifically shows the importance of parental supervision when dealing with delinquency rates.

How Does Family Support Affect Addiction Recovery and Why

Michaela Huber, Tiff Jenson (Mentor)

Despite recent recognition from the medical field that social surroundings significantly impact addiction, research examining the impact of social groups in addiction treatment is still new and relatively limited. In this study, the effects of familial involvement in addiction treatment programs are examined using data from the 1997 National Treatment Improvement Evaluation Study. Patients from 78 different treatment programs across the country were interviewed about family counseling they received during in their program, upon treatment discharge. Post-discharge interviews were conducted approximately 12 months later, when patients’ sobriety was measured on a multi-variable retention rate scale. ...results section...which has not been completed because tests have not been run yet. These findings help to further reinforce the significant influence family participation can have on individuals’ addiction recovery.
Why so violent? A study on the effects of violent video games and juvenile delinquency.

Spenser Atwood, Tiff Jenson (Mentor)

Does an increase in violent video game play increase juvenile delinquency? This question has been looked at in this study. With violent video games being one of the most popular forms of entertainment for youths at this point in time, children are spending more time in the virtual world. They are starting to see the things that they do in video games, such as violence, use of bad language, et.al., as appropriate things to do in the real world. Thus they start to act out and perform violent acts when they become frustrated and when things aren’t going their way. In order to test this I used data that was collected from wave 2 of the national longitudinal study of adolescent health 1998 in order to test my hypothesis. This data was collected by an in house survey to youth between the ages eleven to twenty-one. Some of the implications for future use of this study would be that they are able to see if violent video games are making adolescents more delinquent.

Feeling Overworked

Bria Lebeau

This oral presentation explores the growing need for all individuals to reduce the feelings of being overworked that so readily come into their lives. Many Americans suffer from feelings of being overworked as they struggle to keep up with their daily to-do lists and necessary activities. These feelings, if not reduced or eliminated, can potentially lead an individual to become chronically overworked or burnout as needed personal time is compromised on a regular basis (Collins, 2010). One suffering from feelings of being overworked is negatively affected in diverse areas of their lives. Areas such as their psychological state, their health, and their social relationships (Galinsky, Kim & James, 2001). This presentation examines the opposition which claims that stress can be a good benefit to someone’s health and motivation (Cyprus, 2003). Diverting from the current opposition, it reviews the need for each individual examine their own lives and daily tasks in order to reevaluate how they spend their time and to eliminate unneeded stresses until order and peace can be restored once again. Many people will benefit in life if they are able to recognize the signs of feeling overworked; be it at home or in the workplace.

Are You Feeling Burnt Out?

Jessica Mahler

Burnout is always negative and is caused by perfectionism as well as the experience of emotional exhaustion, depersonalization, and reduced personal accomplishment. Perfectionists are more likely to experience burnout because it is a trait that reflects unrealistic standards for achievement and their commitment to keep those standards as well as their unwillingness to acknowledge their own mistakes. Emotional exhaustion is the main characteristic of burnout and refers to the reduction of personal assets that leads to overpowering feelings of exhaustion. Depersonalization is when employees have an overall attitude of uncaring and are detached from work. Reduced personal accomplishment is a third symptom of burnout; this is a decline in personal feelings of ability and successful accomplishment. As we perceive that our personal accomplishments are reducing, we are involved in burnout’s dimension of self-evaluation. These reduced personal accomplishment feelings occur, as an individual perceives reduced productivity in their workplace as well as a feeling of inefficacy. Reduced personal accomplishment, depersonalization, emotional exhaustion, perfectionism and their effects lead to burnout.
Journey in Light

Austin Shurtliff, Caryn Esplin (Mentor)

As an art major I have studied a great many different types of art. However, these studies have been primarily focused on drawing with charcoal and painting with traditional paint. One year ago this January, I began a journey that has already changed my life a great deal. As part of my minor I took the communication department’s Digital Imaging class. I have always wanted to learn how to take great photos and so I decided that I would try really hard to learn everything I could. To do this I joined the Photographics Society to give me even more of a chance to learn. These choices led to three consecutive semesters in the society (one as an officer), a trip with the society to Photoshop World in Las Vegas, the chance to take the new Professional Imaging class and start my own photography business, and a new direction for my career as an illustrator. Through all of these experiences I have gained a great appreciation for light and its properties. I have learned that I can do anything I want to, and that there is light in the darkest places. I want to use all that I have learned in my journey in light to help promote the Savior, His teachings, and the joy of His Atonement.

Sunday Morning: Songs From the Past

Rachael Anthoney, Caryn Esplin (Mentor)

Founded in 1862, the small town of Bannack, Montana was a place of dreams where hopeful prospectors longed to strike it rich. This small strip of land was home to about ten thousand individuals during its peak years. As was prominent in every early Christian township, a church was established. In the case of Bannack, Methodism was the practiced religion, and in 1877, the Bannack Methodist Church was built. This church was an inspirational pillar to those who braved their ways during the cold and dismal months of winter. it would have once been full of the sounds of song and worship, accompanied by the beautiful undertones of an organ, a popular instrument of the late 1800s. Though not found within the walls of the Methodist church, an elegant pedal organ takes center stage in the home of the, at the time, practicing physician. One of the only homes left in prestigious condition, this house could tell stories for years. The organ is no different. With nearly half a dozen stops and all of its ebony and ivory keys intact, the petite instrument seems timeless against the sepia tones of the surrounding hills. Three small pedals below keep air rushing in, powering a rich, full sound. Though almost everything in this small, desolate town has deteriorated, this organ stands tall and strong to the affects of harsh weather and ruthless time. For decades to come, this organ will endure all nature can throw at it, weaving and tell its tales to anyone willing to listen. If you stand unmoving, you can almost hear the sounds of Sunday morning—peace and warmth—a stark contrast to the bleak and bare hills that keep Bannack hidden from the rest of the world and frozen in time.

"Blackberry Cola" - piano etude no. 3 by Alex Isackson

Alex Isackson, Darrell Brown (Mentor)

"Blackberry Cola" - piano etude no. 3 by Alex Isackson. This is the third of a larger set of piano pieces that I have written in an attempt to discover new sounds, forms, and techniques that have never been done before. Blackberry Cola is an exciting, energy-filled piece that blends several different musical styles including "classical", progressive rock, and jazz. It uses a new kind of form and harmonic progression that I believe has never been used before.
## Dislabled

**Lauren Cook**

*Dislabeled is a campaign that I created for my BFA. As a child with a disabled parent, I have seen firsthand how people with physical disabilities are mistreated and looked at differently. The goal of my campaign is to remove the label society has given to those with disabilities. We will coordinate with schools and classrooms to allow young students to see that people with disabilities are normal people and share common interests with those around them. This personal interaction will cause every party involved to mature exponentially. I have created an informational banner, a website, various social media profiles, and an informational video that will be displayed at the conference.*

## The Pathway Program Infographic

**Angie Steggell**

*I was asked to research and design an infographic explaining BYU-Idaho’s Pathway Program. It was made specifically for the university’s new online magazine called Upward. The Pathway Program was made by President Kim B. Clark to provide people from all over the globe with a higher education. It was designed to accommodate people from many walks of life and who may have certain circumstances preventing them from furthering their education otherwise. The information graphic I made helps make it easier to understand what the program is, who it applies to, and how it works.*

## Fruit

**Danny Morgan, Caryn Esplin (Mentor)**

*My display/exhibit which I plan on showcasing is a picture which I have taken this semester. I would also like to briefly showcase my photography website which I have been working on all semester, which includes portrait, landscape, corporate, product, and many other types of photography. I would like to describe how I took the photo, which will be placed in a 24x36 inch frame, and some of the editing that was done to the photo as well. I would like to use this opportunity to show others what I am capable of in photography, and gain experience in relaying that information to others.*

## The Road Not Taken

**Kameron Kavanaugh, Randall Kempton (Mentor)**

*The Road Not Taken- A setting of Robert Frost’s poem fo chorus and piano. Robert Frost’s poem the “Road Not Taken” is set to music with a SATB chorus and accompanied by the piano. The piece is approximately 5 minutes in length and paints the picture of a traveler’s journey through the “yellow wood.” The piece was originally recorded by the BYU-Idaho Collegiate Singers under the direction of Dr. Randall Kempton and accompanied on the piano by Tyler Carlisle. The piece attempts to musically portray the emotions of walking down the path in the woods, coming to a fork in the road, and the anxiety of making a big decision. Coupling with the choir, the piano attempts to tell its version of the story as well. Dr. Randall Kempton of the BYU-I music department provided helpful feedback on the project and gave additional insight to interpretive performance from the choir.*
"Anthem for Doomed Youth," Art song for piano, harp, and tenor

Mike Merrill, Darrell Brown (Mentor)

In 1917, the British poet Wilfred Owen described some of his emotions that stemmed from his experience in World War I in his poem “Anthem for Doomed Youth.” In an attempt to use the medium of music, the composer has set that text for piano, harp and tenor voice in art song form. In the music, the composer depicts those ideas originally presented by Owen by using extended techniques in the harp and various harmonic arrangements in the piano to depict bell sounds, falling bullet shells, rifle fire, and flickering candles. He borrows from and echoes past musical works, including the plainchant Dies Irae and Benjamin Britten’s “War Requiem” as a way to show that these emotions have spanned countless generations. As the first stanza of the Anthem depicts chaos, confusion, and horror, the composer omitted tonality and regular meter altogether to take away any sense of foundation for the listener. Likewise, as the second stanza has a more methodic, mournful meaning, the music expresses it with a regular pulse in quarter notes and emotive melodies in the tenor voice, displaying the anguish felt by all who experience war either directly or indirectly.