**SAMPLE ENDEAVOR! ABSTRACTS**

**The Acculturation of Medicine in the Peruvian Amazon**

For as long as cultures have been in existence, they have been constantly blended and modified into newer hybrid cultures as a result of contact with outsiders. This process, generally referred to as *acculturation*, often results in the loss of important traditional elements essential to further understanding the society they once constituted. In the Amazon, many people have had difficulty gaining access to health care, an issue which can be attributed o acculturation. Throughout the region, many are impoverished and incapable of receiving the medical care they require due to their financial status. Indigenous traditional healers can provide medicinal plant remedies; however, they can be improved. To make matters worse, the acculturated medical professionals capable of improving such techniques refuse to do so because they ignore such practices in favor of their medical training. Introducing improved plant remedies would not only make them more effective, but also make them more accessible to those of lower class and income. To further investigate this problem, I intend to travel to the Peruvian Amazon to collect information and study the ways people have been affected.   
  
 The research will consist primarily of examining the contrasting viewpoints between modern medical practices versus traditional indigenous remedies.

**Measuring Elementary Teachers’ Perceptions as an Initial and Partial Assessment of the Impact of the Indiana Science Initiative**

This study provides insights into elementary teachers’ perceptions of classroom environment through the launch of a major state science initiative. Elementary teachers were surveyed using the Survey of Elementary Science Teaching (SEST) from April 2011 through April 2012. This year bridged implementation of the Indiana Science Initiative (ISI). The initiative promotes science literacy through inquiry-based science kits and student notebooking. Results indicate an absence of school science safety plans; inquiry-based kits are now predominantly used in regional classrooms; and nearly 60 percent of teachers now participate in science fairs. Responses to the challenges and rewards of teaching elementary science were gathered, categorized, and analyzed. After ISI implementation, teachers report a diminishing challenge for needed equipment and technology and a significantly rising challenge for balancing kit dynamics. Increased teaching rewards for student interest and the use of hands-on learning when teaching science were reported.

**Understanding Population Variation Through Discrete Traits and Cluster Analysis: A Class Project**

Nine students in Human Osteology (ANTH 354) examined six crania from around the world for ten epigenetic traits. Disagreements regarding the scoring of traits ensued with the button osteoma and frontal grooves being the most difficult to score (33% agreement). Only the presence of the metopic suture was agreed upon. The biological relationships between the crania were drawn by counting the number of shared similarities. A cluster analysis was performed using a statistical program (PAST) and the results were compared.

We found the discrete trait results to be in conflict with our expectations based on the general understanding of population histories from genetic data. This exercise demonstrated the pitfalls in using individuals with unknown histories in order to understand modern human clinal variation. These discrete traits appear to have limited usefulness in forensic applications. The mode of inheritance and the population distribution of these traits will be presented. However, more research is needed in order to understand the heritability of these traits.

**2013 ASCE Concrete Canoe - "Rhoboat"**

The University of Southern Indiana (USI) student chapter of the American Society of Civil Engineers (ASCE) is traveling to the regional concrete canoe competition, hosted by Trine University in Angola, Indiana. The canoe shape and concrete mix were developed through research and materials testing as well as structural calculations. At the competition, the team will present their findings from hull design, structural analysis, and concrete mix design. The culmination of the canoe competition will be the canoe races where teams of two men, two women, and a co-ed team of four (two men and two women) will participate in canoe races against the other schools. This will be the final demonstration of how the research and analysis developed throughout the year were combined in canoe design.

**Biodiversity of *mycetozoa*: Addressing Questions of Species Identification Using DNA Sequence Analysis**

*Dictyostelids* are one of the two groups of true slime molds or Mycetozoa. These organisms have a unique life cycle with an amoeboid vegetative phase and multicellular, spore-producing fruiting bodies. In nature, dictyostelids are soil-inhabiting organisms that prey upon single- celled bacteria and fungi. There are approximately 100 known species with new species found regularly as the techniques of molecular biology are used in the analysis of soil. It is know that Mycetozoa can be extremely abundant in soil, but their actual function and diversity is largely unknown. The purpose of this research was to produce DNA sequences to further describe samples from Thailand including a few samples that did not fit the description of currently recognized species. The internal transcribed spacers (ITS 1 and 2) along with the 5.8S region of the nuclear ribosomal gene were amplified through PCR and sequenced. Using the sequences, we developed a phylogenetic tree using known gene sequences for other dictyostelid species from GenBank to determine the most closely related species for each sample examined.

**Mitotic Localization of the CIN-4 Protein in *Caenorhabditis elegans***

Gene duplication can lead to the creation of new genes which may retain former gene functions or may acquire new gene functions. The gene cin-4 found in Caenorhabditis elegans is a partial duplication of the C. elegans topoisomerase II (top-2) gene. Topoisomerase II genes are found in many organisms and are essential for removing DNA topological linkages created during DNA replication. Orthologs of cin-4 are not found in other species of Caenorhabditis suggesting that the duplication creating the cin-4 gene occurred in the C. elegans lineage. Previous results indicated that cin-4 and top-2 are both expressed and have distinct functions in maintaining genome stability. The cin-4 gene is 89% similar to the catalytic domain of top-2. To further characterize this emerging gene family, we undertook to determine the localization patterns of the CIN-4 and TOP-2 proteins in C. elegans embryos. Antibodies directed against each protein were generated and used for immunofluorescence microscopy. Both the CIN-4 and TOP-2 proteins were observed to localize to mitotic chromosomes; however, the localization patterns were spatially and temperally different. To extend these studies, we plan to create fluorescently tagged versions of the cin-4 gene. We will fluorescently tag the cin-4 gene by fusing it with the Green Fluorescent Protein (GFP), a gene which produces a small protein that can be made to fluoresce. The fusion product will be used to construct transgenic strains of C. elegans via biolistic transformation that will express the cin-4-GFP fusion. Establishment of these strains will allow for the creation of site-directed mutations to investigate the sites important for localization and gene function. By determining the roles that cin-4 plays in genome stability, the role of topoisomerase II may be further expanded aiding in the designing of cancer therapies that target topoisomerase II.

**Effect of Meal Composition of Postprandial Blood Glucose Levels in College Students with Varying BMIs and Exercise Patterns**

We investigated the effects of meal composition and levels of physical fitness and body composition on postprandial blood glucose. For 20 college students, BMI was determined and classified (High BMI ≥25; Low BMI <25). Participants self assessed their physical fitness using a Likert type scale (High Fit >5; Low Fit ≤5). Subjects completed an oral glucose tolerance test (OGTT) and in following weeks consumed one of three breakfast meals (all 520 kcals) following an overnight fast in random order: 1) energy drink and toaster pastry; 2) ham and cheese; 3) bagel, peanut butter, and banana. An Accucheck® glucometer was used to determine fasted, 30, 60, and 120 minute postprandial blood glucose levels. All fasted glucose values were normal. Two-hour OGTT glucose remained above 130 mg/dL in both the High BMI and Low Fit groups. Low Fit glucose levels were significantly higher than High Fit at all time periods for both toaster pastry and bagel meal treatments. Similarly, High BMI glucose levels were higher than Low BMI by10.5% at 30 min, 15.8% at 60 min, and 20.8% at 120 min.

The greatest differences in blood glucose level occurred at two hours following the energy drink and toaster pastry (Low BMI 90±3.3 vs High BMI 120±15.3 mg/dL). These results indicate that postprandial blood glucose response depends on both meal composition and the individual’s BMI and level of physical fitness.

**The History and Influence of Guatemalan Masks**

Guatemala is rich in history and culture inspiring me when it came time to create my own Guatemalan mask. In Guatemala, carvers still hand carve ceremonial land souvenir masks influenced by their Mayan ancestry and heritage. These masks may be animals, jokers, devils, or human faces depending on the cultural theme of the dance or festival. The viewer can experience a variety of masks depending on the drama or festival being celebrated. Inspired by the Guatemalan culture and the rich Mayan history from Tikal and Copan, I used the imagery of their rain god, Chac, in the design of a mask. Chac was one of the most important gods in the Mayan religion. The Mayan’s survival depended on the rain for the growing of food. During the excursion in the rainforest of Tikal, I was able to appreciate the natural habitat of several animals. It was important for me to show the influential power the animals had on Mayans in relation to one of their most important gods. I fused these two aspects together to create one cohesive piece that shows the impact that my travels and research had on this project.

**Hydrogen Production Through Beta-Elimination**

Semi-empirical methods are used to investigate the catalytic mechanisms of iridium pincer complexes in dehydrogenation reactions. PM3 and the newer PM6 semi-empirical methods can be used to calculate geometries and energies of chemicals within these mechanisms. The mechanism includes a β-elimination step within the catalytic cycle and was the focus of this study. PM3 and PM6 transition state calculations were performed, and the results where compared. The catalyst was an iridium-based pincer with isopropyl groups. The substrate used in this study was cyclooctane. The PM6 geometry optimizations had little success, so many of the PM6 calculations are single point calculations of results derived from PM3 calculations. This presentation will delve into the results of the calculations found for the β-elimination and the implications it has on the potential production of hydrogen.