

10th Annual Symposium
2011



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April 5, 2011

Dear Endeavor! Participant:

Welcome to the 10th Annual Endeavor! Undergraduate Research and Creative Works Symposium at the University of Southern Indiana! As a participant in the symposium, you are deepening your undergraduate learning experience and exhibiting initiative that is valued by graduate degree programs and employers. During the symposium, take the opportunity to get to know students and faculty from other departments and universities. Building networks outside your discipline is an important part of preparing for the next step after you complete your undergraduate education.

Congratulations on being a participant in USI's Endeavor! Symposium and best wishes to you.

Sincerely,

A handwritten signature in black ink that reads "Linda L. M. Bennett". The signature is fluid and cursive, with the first letters of each word being capitalized and prominent.

Linda L. M. Bennett, Ph.D.

President



April 5, 2011

Dear Endeavor! Symposium 2011 Presenters and Sponsors,

Welcome to the 2011 Endeavor! Symposium. Your work has swelled the number of participants to over 90 and the number of researchers and artists to more than 100. Your work has advanced discoveries in all your fields of research and creativity, and I am certain you have energized the University of Southern Indiana's educational culture.

The Endeavor! Research and Creativity Awards Program operates on the assumption that when you follow a passion, you will emerge with a better education and stronger ties to your learning than the education you develop by studying and taking tests. The synergy between research and learning is the foundation for the best learning created.

Likewise, when sponsors follow their curiosity and their students' curiosity, they become better, more insightful and grounded professors. I sincerely hope that all of you found one of your research or creativity passions and that your Endeavor! Award gave you the freedom to be curious and inventive.

Congratulations to you!

Sincerely,

A handwritten signature in black ink, appearing to read "Jane Johansen". The signature is fluid and cursive, with the first name being more prominent.

Jane Johansen

Director

Endeavor! Research and Creativity Awards

Endeavor! Symposium Agenda

Tuesday, April 5, 2011

University Center

7:30 – 8:30 a.m.	Check-in for all presenters and sponsors: Receive programs and ID badges at front hall table
8:30 – 11:40 a.m.	Oral Presentations University Center rooms 205, 214, 215, 2203, 2205, 2207, 2217
9 a.m.- Noon	Poster and Artwork Sessions University Center, Carter Hall D Presenters of posters and art pieces will be available for one assigned hour.
Noon – 1 p.m.	Lunch for Presenters and Sponsors provided by Endeavor! Research and Creativity Awards Program <i>Badges are lunch tickets!</i>
1 – 2 p.m.	Breakdown of all presentation and poster materials and objects

Endeavor! Program Committee

Antonina Bambina	Honors Program
Thuy Daojensen	Bower-Suhrheinrich College of Education
Wes Durham	At Large, College of Liberal Arts
Khaled Elkhal	College of Business
Wendy Turner-Frey	College of Liberal Arts
Edith Hardcastle	Pott College of Science and Engineering
Peggy Harrel	Director, Office of Grants and Sponsored Research
Lindsey Olliver	Honors Program
Karen Parker	Nursing and Health Professions
Jane Johansen	Director, Endeavor! Research and Creativity Award Program College of Business

Acknowledgments

The Endeavor! Committee would like to thank the following for their support of the Endeavor! Research and Creativity Award Program and Endeavor! Symposium.

Dr. Linda Bennett, President University of Southern Indiana

Dr. Ronald Rochon, Provost University of Southern Indiana

Dr. Brian Posler, Assistant Vice President for Academic Affairs

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Dr. Jeff Seyler

Ms. Allison Skinner

Dr. Michael Slavkin

Dr. Anne Statham

Dr. Rex Strange

Dr. Edmir Wade

Dr. Kenneth Walsh

Ms. Carrie Wright

Dr. Stephen Zehr

9 a.m. POSTER SESSIONS

Carter Hall

NAME	SHORT TITLE
Roxanne Burton	The History and Influence of Guatemalan Masks
Katelyn Cordell	Color Tuning of BODIPY Derivatives by Changing the Substituents at 2 and 6 Positions of the BODIPY Core
Amanda Harrawood and Tina Kraft	Bladder Buzz
Luke Maurer	Cow and Veal Dung are Differentially Attractive to Dung, Rove, and Carrion Beetles
Tulsi Modi	Alpha vs. Beta C-H Bond and Activation
Becky Morris	Thru-Hiking the Appalachian Trail
Rebecca Pitzer	Antifeminism vs. Feminism: Who Holds the Privilege in Society?
Meghann Reardon	The Role of HCP-2 in Neuronal Function in <i>Caenorhabditis Elegans</i>
Brad Roberts	Reductive Animation Using Formic Acid Under Mild Conditions
Jacob Schneider	Synthesis of Dehydrogenation Catalysts
Caryn Yochum and Jason Boyle	A Multidimensional Fitness for Elementary Students
Megan Miller	Sex Education in High School

10 a.m. POSTER SESSIONS

Carter Hall

NAME	TITLE
Maria Bengert and Tina Bledsoe	Characterizing Hydrogeological Conditions in Advance of Ecosystem Restoration in the Manistee National Forest, Michigan
William Davis and David Fosburgh	Exploring the Perceptions of Yoga for College Athletes: A Mixed Method Study
Andy Frazee	Cytoskeletal Protein Determination and Its Correlation with Cellular Motility
Amanda Harrawood and Abby Schmitt	Promoting Walking to USI's Campus
Ashleigh Janiga	Testing the Viability of Colonizing-Competent <i>Vibrio Fischeri</i> in a Nonculturable State

Jessica Lingafelter and Michelle Sievers	Determination of Physiological Factors Influencing Development of Disease in College Freshman Students
Cody McGill	Methods to Estimate the Localization Effects in One-Dimensional Disordered Photonic Bandgap Structures
Prince Nzeata	Intramolecular Energy Transfer in a Novel GODIPY-Quinolate Co-Polymer
Jacob Schneider	Synthesis of Dehydrogenation Catalysts
Gandalf Nicolas	That's So Gay!: Relationship Between the Use of the Word Gay as a Negative Term Unrelated to Sexual Orientation and Negative Attitudes Towards Homosexuality

11 a.m. POSTER SESSIONS

Carter Hall

NAME	TITLE
Clinton Broach	Sedimentological Examination of Lithofacies Associated with Coal Seams of the Linton and Petersburg Formations (Pennsylvanian) in Vanderburgh County, Indiana: Implications for Coal Formation and Origins of Coal-Bed Methane
Cameron Brown, Justin Dartt, Dr. Jeanne Barnett	Influence of Beta-Glucosidase on the Efficacy of Extracts from <i>P. lanceolata</i> on Suppression of HSV-1 Replication
Thomas Chambers and Ryan Voegerl	Fluvial History of Meander Abandonment in the Wabash River of Posey County, Indiana
Jesse Derrington II	Classification of the Rhodopsin (Rh1) Gene in N. American Catfishes
Nick Earls	Progress Toward the Synthesis of Novel Photochromic Molecular Switches Containing Dithienylethene
Preston Edge and Logan Schmitt	Elementary Number Theory of Perplex Numbers
Kristen Jones	Synthesis of Hydrogen Storage Molecules
Joseph Kawa	Adapting the Reactions Toward a Dithiopin-Based TNT Host Molecule
Alicen Schwartz	New Methods for the Synthesis of Selenoglycosides
Amy Bleichroth	Provenance Study of Prehistoric Obsidian Artifacts from the Mann Site in Posey County, Indiana, and Their Archaeological Significance
Sharona Fowler and Kelly Fitzgerald	The Effects of Driver Race and Gender on Civil Case Judgments

PRESENTATIONS

University Center rooms 205–2217

	Room 214		Room 215	
8:55 – 9:10 a.m.	Maria Jalilpour-Esfahani	Government Adjustments in Student Education Funding	Ben Sutter	Creating an Acoustic Guitar
9:20 – 9:35 a.m.			Ben Balbach and Kashif Shah	Attitude and Heading Control of an Autonomous Quad Rotor Helicopter
9:45 – 10 a.m.	Nicholas Yehl	Repossessing Yourself: A Study of Exorcism and Psychological Relevance	Brett Bueltel and Ashley Scott	2011 IMA Student Case Competition
10:10 – 10:25 a.m.	Lindsey Oakes	Understanding Politician's Use of Social Media to Manage Constituent Information	Stephen Oakley	Drug Panic, Moral Panic, or Both: Ecstasy in the Early Part of the Millennium
10:35 – 10:50 a.m.	Theodore Clunie	Sociolinguistic Analysis of Mayan Speakers in Antigua, Guatemala	Samantha Smith	Wind Power Feasibility Study
11– 11:15 a.m.	Amy Brown	The Challenge of Sustainability: Understanding the Dynamics between Multi-National Environmental Non-Governmental Organizations and Rural Communities in the Maya Biosphere Reserve Petén, Guatemala	Pietrykowski	Explorations in Traditional Lithographic Methods Through Participation in the Frogman's Printmaking Workshop

	Room 205		Room 2203	
8:30 – 8:45 a.m.	Amanda Turner	Amuletic Occurrences of Flies in the Mediterranean and Their Interpretation	Evan Niemeier	The Prevalence of Insulin Resistance in USI College Freshmen
8:55 – 9:10 a.m.	Alex Love	Necessity and Hostility: A Tale of Two Mystic Spears	Anne Hillyard and Jonathon Behrens	Distribution of Body Fat and Blood Lipid Levels in USI Freshman Students
9:20 – 9:35 a.m.	Heather Manley	Physical Representations of Worship in Hinduism	Emily Craig	Nutritional Analysis in the College Student Population and Its Association with Insulin Resistance
9:45 – 10 a.m.	Adrienne Curtis	Healthy or Tasty?: Perceptions of Food and How the Human Appetite is Fulfilled	Courtney Perry	Stress and Insulin Resistance
10:10 – 10:25 a.m.	Weston Ellis	Hydrogeological Characteristics and the Stratigraphic Transition from Lacustrine Marl to Peat in a Riparian Wetland, Manistee National Forest, Michigan	Bradley Painter	Identifying Social Complexity in Prehistory through Craft Specialization and Stone Tool Production
10:35 – 10:50 a.m.	Walker Byer	The Human Figure in Medicine and Mysticism	Andrew Kern	Amotivation and Obstruction of Workflow in Bicycle Service Shops
11 – 11:40 a.m.	Adam Powell, Morgan Devine, and Tina Bledsoe	Geomorphologic Analysis of a Drainage Basin Feeding the Proposed Constructed Wetland in Southwestern Vanderburgh Co., IN	Tina Keltner and Mindy Prien	Piggy-Back Back Pack Program

Room 2205		
8:30 – 8:45 a.m.	Sunny Huang	A Nicotine-Induced Conditioned Place Preference Paradigm in Larval Zebrafish
8:55 – 9:10 a.m.	Matthew Mitchell and Nicholas Marlin	Helping Others Understand the Financial Information Professions
9:20 – 10:25 a.m.	Christopher Cornwall	The Use of Formal Logic in the Malleus Maleficarum
10:10 – 10:50 a.m.	David Clayton and Alan House	NASA Lunabotics Mining Competition 2011
11 – 11:40 a.m.	Andrew Bostrom, Basil Khaja, and Jason DeVillez	SAE Baja Competition

	Room 2207		Room 2217	
8:30 – 9:10 a.m.	Kaitlin Fest and Travis Hatfield	Slope Stability and Soil Development of Cultivated Soils in Relation to Infiltration Capacity, Vegetation and Runoff of Two Sites in Vanderburgh County, Indiana	Traci Johnson	Celtic Cultural Connections Between England, France, and Ireland
9:20 – 10 a.m.	Kristen Schmeisser	Classroom rocks: A Service-Learning Project to Increase Pedagogical Tools for Local Earth Science Teachers and K-12 Student Interest in Geology	Amy Brown	University of Southern Indiana Faculty Environmental Sustainability Survey Results
10:10-10:50 a.m.	Ashley Altheide	Classroom rocks: A Service-Learning Project to Increase Pedagogical Tools for Local Earth Science Teachers and K-12 Student Interest in Geology	Kenneth Schnautz, Dakota Scheiber, D. J. Horstman, Erik Davis	High Altitude Balloon Competition Pod
11– 11:40 a.m.	Emily Craig	Nutritional Analysis in the College Student Population and Its Association with Insulin Resistance	Kyle Rupert and Ashley Riester	Before the Rain: Creating a New Musical

ORAL PRESENTATION ABSTRACTS

Attitude and Heading Control of an Autonomous Quad Rotor Helicopter

Ben Balbach, Kashif Shah

Faculty Sponsor: Dr. Ronald Diersing

The objective of this project is to design, model, and develop an Autonomous Unmanned Aerial Vehicle (AUAV). The resulting AUAV will compete in the International Aerial Robotics Competition where schools such as MIT and Georgia Tech have previously competed. The project will incorporate a broad spectrum of engineering skill sets including control system design, electronics, programming, and other various fundamental engineering concepts. The project will promote growth in learning through the experience of completing the project. It will also allow underclassmen to work side by side with more experienced upperclassmen and receive hands-on experience. It will provide students with the opportunity to see their hard work and determination pay off. The initial goal will be to design a vehicle capable of flight while carrying the necessary instruments and payload. Then a working mathematical model of a control system will be developed for stabilization of the vehicle in flight. Once this has successfully been accomplished, an algorithm can be developed for the necessary parameters associated with the competition. This will be done through the use of a 3D camera system to analyze the vehicle's surrounding environment. Upon the completion of these tasks, they can be combined and run simultaneously to allow for autonomous flight and completion of the course. This will result in a fully operational Autonomous Unmanned Aerial Vehicle.

Lattice Splitting Over the Ring of Integers

Olivia Bearman

Faculty Sponsor: Dr. Edward Rehkopf

Many researchers are trying to answer the Classification Questions for lattices. They want to know if lattices are isometric, so they look at the relationship between matrices. Two lattices, L and M , are isometric if and only if their associated matrices are integrally congruent. Two matrices, A and B , are said to be integrally congruent if and only if there is a unimodular matrix T such that $B = T^t A T$. An arbitrary matrix A is said to be unimodular if its determinant is equal to positive or negative one. The associated matrices are determined by the Gram matrix, which depends on the chosen basis $\{v_1, v_2, \dots, v_n\}$. Then the lattice is associated with the matrix $A = (a_{ij}) = B(v_i, v_j)$.

The lattices over integers, the \mathbb{Z} -lattices, have not been fully classified; this project focused on these lattices over integers to help further understand them. Since I worked with \mathbb{Z} -lattices, I was only concerned with the unimodular matrices described above. The question I tried to answer was this: Given a \mathbb{Z} -lattice L with associated matrix A , is there a matrix T such that the determinant of T is equal to positive or negative one for which its integrally congruent matrix split into two lattices of smaller dimension? The idea of splitting a lattice is where a single lattice can be decomposed into two smaller lattices.

I began studying with a matrix A that represented a lattice splitting and used different matrices T_i to construct many different matrices that were integrally congruent. I then worked at reversing the process to understand how and when it would occur.

Characterizing Hydrogeological Conditions in Advance of Ecosystem Restoration in the Manistee National Forest, Michigan

Maria Bengert, Tina Bledsoe

Faculty Sponsor: Dr. Paul Doss

Field-based characterization of hydrogeological conditions at an ecosystem restoration site in the Manistee National Forest, Michigan provides baseline data in advance of prescribed forest canopy reduction. The Pines Point study area was historically a natural savanna that currently includes plantation pine forests created during depression era efforts of the Civilian Conservation Corps, and oak forests resulting from fire suppression efforts during the 1900's. The forest service will reduce canopy cover on nearly 3000 acres of red pine and oak forest to restore savanna habitat, in part to re-establish appropriate habitat for the endangered Karner Blue Butterfly. We hypothesize that this forest cover reduction will generate an increase in groundwater recharge and a resultant increase in discharge to the adjacent White River. Three drilled groundwater-monitoring wells equipped with transducers and data loggers were installed in the upland restoration site between the North and South branches of the White River. Pre-restoration monitoring sites include red pine plantation, oak, and pine/oak transition forests, all of which overlie a permeable sand and gravel aquifer that discharges directly to the adjacent White River. Groundwater fluctuations and seasonal water table response vary across the Pines Point restoration site. Initial hydrograph records show variable groundwater level fluctuations and growing season declines at all sites. The depth to water table ranges from 10 to 18 m, and all sites display responses to precipitation events. Between May and August 2010, water-table declines ranged from 0.12m at PPW3 and 0.05m at PPW2. Sediment samples from the screened intervals, recovered during drilling, are variably sorted, dominantly quartz sands. Continuing and future work includes sedimentological analyses of drilling samples, further hydrographic analyses of water-table behavior, and potential installation of on-site meteorological instrumentation and additional wells to further quantify hypothesized changes to groundwater levels.

Provenance Study of Prehistoric Obsidian Artifacts from the Mann Site in Posey County, Indiana, and Their Archaeological Significance

Amy Bleichroth

Faculty Sponsor: Dr. Paul Doss

The geological sources of lithic artifacts help to reconstruct exchange patterns and trade routes of prehistoric cultures. Obsidian sourcing, in particular, is especially reliable because source outcrops are typically homogenous and occur in limited geographic regions. Five obsidian artifacts recovered from a Prehistoric Hopewell Site known as the Mann Site in Posey County, Indiana, were analyzed by non-destructive x-ray fluorescence for this study. The Hopewell culture flourished in Southern Indiana during the Middle Woodland Period (200 B.C to A.D. 500). Prehistoric obsidian artifacts recovered from Southern Indiana archaeological sites are noteworthy, given that the nearest known obsidian source is over 1600km (1,000 miles) away.

The trace element characteristics, specifically Sr versus Zr, confirmed the source for four of the five Mann Site artifacts as the Bear Gulch, Idaho obsidian source. One obsidian blade originated from Obsidian Cliff, now in Yellowstone National Park, Wyoming. Two other artifacts, known to originate from the Yellowstone Plateau, showed trace element signatures representing the Obsidian Cliff source. For comparison, two fine-grained volcanic lithic artifacts from West Virginia with distinctly different trace element characteristics originate from a geologic source yet to be determined.

Identifying the geologic source of obsidian artifacts from the Mann Site confirms that, like other Hopewell cultures in the Midwest during the Middle Woodland Period, inhabitants of the Mann Site either obtained obsidian through trade or by traveling to Obsidian Cliff in Yellowstone National Park, Wyoming, and Bear Gulch, Idaho.

SAE Baja Competition

Andrew Bostrom, Basil Khaja, Jason DeVillez

Faculty Sponsor: Dr. Glen Kissel and Dr. Paul Kuban

Three USI engineering seniors are designed, buildt, and tested a single-passenger off-road vehicle to compete against other schools this summer, in order to fulfill their Senior Design Project requirement. The Society of Automotive Engineers (SAE) hosted the competition, which was held at Bradley University in Peoria, Illinois, from June 8th-11th. USI's team was one of over 100 teams from around the world to compete against each other in a series of events including a four-hour endurance race and a rock crawl. The purpose of the competition was to create the best design for a vehicle at the lowest cost which is also able to be mass produced.

The car was driven by a member of the USI Baja SAE student chapter. The car also followed each of the SAE club rules. These rules included specific frame dimension limits, the use of only one unmodified engine provided by Briggs and Stratton, and the team's abiding by all safety constraints. This limited the power and handling improvements to be based solely on the design of the individual components of the Baja SAE vehicle such as the layout of the drive-train, suspension design, and the overall weight of the vehicle. To help prepare for this competition, the team was given access to a test track located off of Broadway Street in Evansville, which is owned by USI. This track includes most of the terrain types in the SAE Baja competition. This includes steep hills, dirt ramps, sharp turns, and long stretches of straight track. The testing of the car on the test track was recorded. The USI Baja vehicle design has been broken up into three subsections, each managed by one of seniors. The subsections were suspension, drive train, brakes, and safety.

Sedimentological Examination of Lithofacies Associated with Coal Seams of the Linton and Petersburg Formations (Pennsylvanian) in Vanderburgh County, Indiana: Implications for Coal Formation and Origins of Coal-Bed Methane

Clinton Broach

Faculty Sponsor: Dr. Bill Elliott

Four intervals of core were collected from the Linton and Petersburg formations (Pennsylvanian) from an exploration well drilled on the campus of the University of Southern Indiana. The well is part of an economic and geologic assessment that examined potential for Coal-Bed Methane (CBM) production. These cores contain in stratigraphic succession the Seelyville, Survant, Houchin Creek, and Springfield coals. The purpose of this research is to complete a sedimentological study of the bedding, sedimentary structures, and fossil content of lithofacies above and below these coal seams to assess coal formation and potential origins of CBM. The Seelyville coal was cored from 668 to 664 feet. This coal is underlain by a grey to tan mudrock with 1-cm diameter siderite concretions and overlain by light grey, laminated mudrock with 1-cm siderite concretions. The Survant coal was cored from 558 to 556 feet. This coal is underlain by 15-cm of organic-rich shale capping a well sorted, mica-bearing, quartz arenite and overlain by grey, laminated mudrock with 2-cm diameter siderite concretions. The Houchin Creek coal was cored from 505 to 507 feet. The Houchin Creek coal is underlain by ripple cross-laminated to flaser bedded sandstones grading upward into irregular bedded, green-grey, silty sandstones with concretions and overlain by black, organic-rich, laminated mudrock. The Springfield coal was cored from 414 to 410 feet. This coal is underlain by light grey, marcasite-bearing, mudrock and overlain by black, organic-rich, laminated mudrock with disseminated marcasite and bands of 1-cm diameter siderite concretions grading upward over two feet into a laminated mudrock containing abundant *Lingula carbonaria* and ostracodes.

The lithofacies associated with coal seams in these formations attest to varying paleoenvironmental conditions prior to and after coal formation. In all four intervals, coals are capped by laminated mudrock

with marine fauna present above the Houchin Creek and Springfield coals. The lithofacies below the four coals vary from laminated mudrock to tidally influenced sandstones. This suggests the existence of variable depositional environments prior to coal formation but preserved by marine flooding. The varying lithofacies below these coal seams may impact the potential for CBM.

The Challenge of Sustainability: Understanding the Dynamics between Multi-National Environmental Non-Governmental Organizations and Rural Communities in the Maya Biosphere Reserve Petén, Guatemala

Amy Brown

Faculty Sponsor: Dr. Daniel Bauer

Multi-national environmental non-governmental organizations (MN-ENGO) utilize billions of U.S. dollars annually to develop projects expected to protect fragile biologically diverse regions. Rural communities within these protected regions are often characterized by marginalized populations with high poverty rates. Large environmental institutions, which are known for administering a top-down approach, often use mitigation plans that include restricting traditional means of production which conflict with the community's basic subsistence needs. This is exemplified in the Petén region of Guatemala within the Maya Biosphere Reserve. Organizations like Conservation International and Wildlife Conservation Society (WCS) which control large areas of this 4.5 million acre rainforest reserve and attempt to balance conservation efforts with a local population of over 600,000. Natural resource exploitation in the form of industrial logging, oil exploration, mining, and large scale agriculture or ranching are also constant threats that increase forest degradation, while perpetuating social and environmental inequality in the region. This study aims to understand the progression and success of two primary conservation organizations (ProPetén and WCS) and two communities in restricted core conservation zones (Paso Caballo and Uaxactun) within the Maya Biosphere Reserve through an examination of data from literature, media, field observation, and interviews. Both communities studied have a long history in the Petén, but each has developed very different strategies for managing resources, obviously some more successful than others. Significance regarding sustainability, representation, local-level participation, and equitable development is a primary focus. Field research and interviews were conducted in Guatemala and the Maya Biosphere Reserve from March 12th through the 19th of 2011. This project provides a depth of experiential education in social science research and gathered essential insight into the future of successful social and environmental sustainability projects.

University of Southern Indiana Faculty Environmental Sustainability Survey Results

Amy Brown

Faculty Sponsor: Dr. Stephen Zehr and Dr. Rhonda Priest

In January 2010, the University of Southern Indiana officially announced its commitment to environmental sustainability through President Bennett's commission of the USI Environmental Stewardship Council (ESC). Within the first year, ESC developed three student internship positions to help fulfill parts of the committee's mission. One of the primary goals of the ESC is community-wide culture change toward environmental sustainability. The foundation of catalyzing an awareness and action of environmental issues is an understanding of the currently held beliefs and behaviors toward environmental sustainability within the campus population. Through sponsorship by the College of Liberal Arts and the Department of Sociology, Anthropology, and Criminal Justice Studies, an internship was developed to produce a survey instrument to measure environmental beliefs and behaviors of the USI campus population. The study sampled 136 full-time faculty through a confidential survey and interview process. The survey was designed by a sociology student intern using questions and scales of previously published studies including Indiana University's

Student Environmental Survey developed through the IU Department of Sociology and sponsored by the IU Office of Sustainability (2009-2010); Santa Clara University Markkula Center for Applied Ethics Campus-Wide Sustainability Study (2009-2010); and use of The Motivation Toward the Environment Scale (MTES) developed by Pelletier, L. et al. (1998). The study was administered by students from the Fall 2010, SOC391: Social Research classes.

This study was developed as a tool for the USI ESC to understand currently held views, motivations, values, and knowledge of sustainability by university educators. This information is relevant in developing meaningful action plans geared toward the environmental sustainability needs of our campus. The presentation will highlight the preliminary frequency results from the completed survey. Broader questions about challenges to sustainability and environmental literacy will be addressed. This data will then be available for all ESC working groups to encourage development of strategic plans with a greater knowledge of the campus culture. USI students and staff will be surveyed in future studies to give the committee a foundation for action plans and a measurement for evaluating strengths and weaknesses of the organization's ongoing efforts.

Influence of Beta-Glucosidase on the Efficacy of Extracts from *P. lanceolata* on Suppression of HSV-1 Replication

Cameron Brown, Justin Bass, Dr. Jeanne Barnett

Faculty Sponsor: Dr. Eric McCloud

Plantago lanceolata is an introduced perennial forb common in lawns and disturbed habitats throughout the United States and much of the world. It has many reputed medicinal benefits. These may be derived from its defensive compounds. Treatment with β -glucosidase increases the anti-viral capability of *P. lanceolata* extract against HSV-1 in BHK cells. Unlike other antiviral assay systems, neither iridoid glycosides nor iridoids treated with β -glucosidase showed increased antiviral activity. Verbascoside, a phenylpropanoid glycoside present in *P. lanceolata*, has anti-viral activity in this system, though efficacy was not improved by addition of β -glucosidase.

2011 IMA Student Case Competition

Brett Bueltel, Ashley Scott

Faculty Sponsors: Dr. Brian McGuire and Mrs. Jeannette Maier-Lytle

Our presentation is for the 2011 IMA Student Case Competition. We have a four-member team with three members playing the role of managers in the company and the final member playing the role of the CEO. The competition presents a managerial accounting problem for an airline company of a foreign country. The airline is a monopoly but will begin facing competition for the first time due to open elections being held. The airline needs short-term and long-term goals for survival. Some of our propositions include implementing a more accurate allocation of costing through activity based costing and using fuel hedging to eliminate uncertainty due to volatility of fuel prices.

The History and Influence of Guatemalan Masks

Roxanne Burton

Faculty Sponsors: Mr. Rob Millard-Mendez and Mr. Michael Aakhus

Guatemala is rich in history and culture inspiring me when it came time to create my mask. In Guatemala, carvers still hand carve ceremonial and souvenir masks influenced by their Mayan ancestry and heritage. Ceremonial masks are used for festivals, dances, and decoration. These masks may be animals, jokers, devils, or human faces depending on the cultural theme of the dance or festival. The viewer can experience 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 am using 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 Mayans' 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 the Mayans in relations to one of their most important gods. I wanted to fuse these two aspects together to create one cohesive piece that shows the impact that my travels and research have had on this project.

The Human Figure in Medicine and Mysticism

Walker Byer

Faculty Sponsor: Ms. Patricia Aakhus

The research to be presented concerns the use of dolls, poppets, fetishes, and other representational figures in the practice of religion, spirituality, and folk magic across multiple cultures. The use of these figures has been discovered in cultures stretching from the Yoruba tribes of Africa into contemporary spiritual practices. While these objects have been the subject of study in various disciplines such as anthropology, history, psychology, and religion, very few interdisciplinary studies of the artifacts have been made. The form of my research has been an interdisciplinary approach that unites these various fields. The objective throughout my study (through readings and documentation of artifacts in museums) has been to develop an understanding of the similarities and differences of these objects in their use and forms across cultures. In addition to their historic use, attention has been given to their incorporation into modern-day culture in an attempt to link the past to the present, searching for the origins of certain contemporary traditional practices such as the use of the voodoo doll. Documentation of select artifacts from various cultures and historical periods was made during the period of the grant support at the Ashmolean Museum and Pitt Rivers Museum of Ethnography in Oxford, England, and at the British Museum in London, England. All of the sites contained representative artifacts, but the most extensive collections of objects related to my study were displayed at the Pitt Rivers Museum in Oxford, where the majority were collected during the nineteenth century by amateur anthropologists and historians. Attention was given to these figures in regards to their point of origin, age, size, symbolism, and materials used to make it. In my presentation I will focus on representative artifacts across cultures with complex traditional uses, including photographic documentation made during the study at the Pitt Rivers Museum.

Fluvial History of Meander Abandonment in the Wabash River of Posey County, Indiana

Thomas Chambers, Ryan Voegerl

Faculty Sponsor: Dr. James Durbin

The Indiana side of the Wabash River valley in Posey County, Indiana, contains evidence in the form of meander scars that the river had a different position in the past. Meander scars indicate a previous location of the river channel. These scars are easily identified on aerial photographs and topographic maps. Our research project allowed us to examine sediments that comprise the meander scars. The goals of this research were to examine the processes that created these meanders, determine when these meander scars were created by the active river, and then calculate the rates of meander migration. We are hoping to understand the past, present, and future of the Wabash River in this particular part of the Wabash Valley. In the past, the Wabash changed from a braided river (many active channels) to a meandering river (curvy) when the glacial climate changed (Knox, 1983). By examining where the Wabash has been in the past, we can interpret possible future locations for the meandering stream. Additionally, we determined the timing and duration of meander creation, abandonment, and backfilling. Funding was used for radiocarbon age dating of sediments and for materials to transport sediment core(s) back to USI.

NASA Lunabotics Mining Competition 2011

David Clayton, Allen House

Faculty Sponsor: Dr. Glen Kissel

Five Senior Engineering students are building a robot to compete in the 2011 NASA Lunabotics Mining Competition to be held in Florida from May 23-28, 2011. This robot will be the capstone project for four of the engineers on the team and is the subject of independent research for ENGR 499 for the fifth member of the team. The purpose of the robot being constructed is to excavate Black Point 1, BP-1, volcanic ash that simulates the dirt on the moon's surface. USI's team will be competing against over 540 other teams from universities from around the country to dig and collect a minimum of 10 kilograms of BP-1 using an automated or remote controlled robot within the 15-minute time limit. NASA's interest in lunar regolith excavation stems from the prospect of colonizing the moon. The regolith, dirt, on the moon's surface contains many useful elements that can be separated to be used in a wide range of applications, from making building blocks for shelters to making fuel and producing oxygen for life-support.

The robot must have on-board power to operate its drive and exaction systems. USI's design uses a scoop and bucket system to dig and a four wheel system with differential or "tank" steering. The team will test the robot in a test bed to be constructed in the Business and Engineering Center. These tests will be recorded to show the functionality of the robot.

Sociolinguistic Analysis of Mayan Speakers in Antigua, Guatemala

Theodore Clunie

Faculty Sponsor: Dr. Norma Rosas-Mayén

My research project focused on the sociolinguistic attitudes of residents of Antigua, Guatemala, who speak Kaqchikel, the official Mayan language of the region. I completed several structured interviews in Spanish with the indigenous people who also speak Kaqchikel, asking questions that would shed light on the future of their language. The answers I received all pointed toward a strong decrease in the number of Kaqchikel speakers in the coming generations. One of my informants, from her own observations, said

that only about 60 percent of young people (aged 25 or younger) choose to continue speaking Kaqchikel and to wear the traditional dress that would identify them with the indigenous population. Another young indigenous girl, when asked if she spoke Kaqchikel, responded, "No. That's the language of our grandparents."

With my presentation, I will examine the reasons for the recent decrease in the number of Kaqchikel speakers and what needs to be done to stop it. After analyzing the information provided by several informants, I can conclude that with the loss of a Mayan language go many other aspects of the rich Mayan culture of Guatemala including ceremonies, traditions, and clothing. Although many of the indigenous people had difficulty articulating why the gradual loss of their language is such an important issue, nearly all of them recognized that it is indeed a problem that would negatively affect them both culturally and economically. Antigua survives on the support of tourists who come to Guatemala to experience Mayan culture and purchase authentic goods. Many vendors told me that tourists buy almost exclusively from people wearing the traditional Mayan dress because they want to support the local indigenous population. However, if the current generation continues its trend away from the Kaqchikel language and culture in favor of more modern, western culture, Antigua will likely lose its attractiveness to tourists, and therefore cause the indigenous population to suffer economically. The gradual loss of the Kaqchikel language is a problem that requires action before it is too late to reverse the damaging effects of its decline on the indigenous residents of Antigua.

Color Tuning of BODIPY Derivatives by Changing the Substituents at 2 and 6 Positions of the BODIPY Core

Katelyn Cordell

Faculty Sponsor: Dr. Priya Hewavitharanga

Due to their superior photochemical and photophysical properties, BODIPY (4,4'-difluoro-4-bora-3a,4a-diaza-s-indacene) dyes have found a wide variety of applications in electronic, biomedical, and various other fields. Photophysical properties of BODIPY derivatives can be fine-tuned by changing the substituents of the BODIPY core. BODIPY derivatives with hydrogen, methyl, ethyne, ethynyltrimethylsilane, and iodine at the 2 and 6 positions were synthesized. This resulted in considerable change in absorption and emission wavelengths as well as fluorescence quantum yields. Details regarding the synthesis and the photophysical properties of these novel BODIPY compounds will be presented.

The Use of Formal Logic in the *Malleus Maleficarum*

Christopher Cornwall

Faculty Sponsor: Dr. Carol Mackay

In 1486AD, theologians of the Dominican order published the infamous inquisitorial text known as the *Malleus Maleficarum* (Witch's Hammer). It was considered the most comprehensive and authoritative source on witchcraft of the late medieval era and would remain so for centuries to come. With an endorsement from the Catholic Church, its treatises served as a handbook for the persecution of the heretical art known as witchcraft. In addition to the detailed instructions for trying a heretic, the *Malleus* also defends its own legitimacy by proving the existence of witchcraft with a combination of formal logic and Christian doctrine. This argument was key to its acceptance by both the theological and secular communities and ultimately to its lasting impact as a misogynistic and deadly guide.

The discourse used in the *Malleus* reflects the formal training in logic that authors Heinrich Kramer and Joseph Sprenger would have received as students of theology. While medieval rhetoric in general

stemmed from Roman texts such as Cicero's *De inventione*, by the 12th century students of moral philosophy would have been familiar with the works of Aristotle. This period began a progression of rediscovery of Aristotelian rationality in the areas of logic, physics, metaphysics, psychology, ethics, and politics. Although these theories provided theologians with the means to question and reason with what was considered as "truth," the Neo-Platonic scaffolding of Christianity remained unchanged.

This "philosophical logic" that was so integral to intellectual life became increasingly sophisticated and formalized, constituting a genre of late medieval discourse that lasted from the 12th to mid-16th century. Now, since the *Malleus* was published near the end of this tradition (c. 1486), its argumentative force reflects the advancement of classical logic as a technique into a comprehensive theory of formal consequences. This paper will examine passages from the *Malleus* to show the progression of medieval logic and how it was used to defend its proposition that witchcraft is real.

Nutritional Analysis in the College Student Population and Its Association with Insulin Resistance

Emily Craig

Faculty Sponsor: Dr. Mari Hopper

Throughout the past three decades, there have been significant changes in the American diet showing an increased consumption of foods high in fat and carbohydrate (CDC, 2010). This trend is closely associated with the increase of obesity. Insulin resistance is often associated with obesity and a diet high in calories, fat, and simple sugar (Hamman, 1992). The aim of this study was to determine the dietary patterns of college freshmen students and analyze relationships between diet, adiposity, and insulin resistance. A Block 2005 Nutritional analysis was performed for 26 college freshmen students (12 men and 14 women). Comparison of macromolecule distribution expressed as a percent of total calories ingested revealed that women tended to ingest slightly more carbohydrate (54.26% vs. 49.72%) and less fat (32.99% vs. 35.91%) than the men. These values are within the acceptable macronutrient distribution ranges (carbohydrate: 45%-65%; fat: 25%-35%). To further investigate the relationships between diet, percent body fat, and insulin resistance, subjects were divided into three groups: low body fat percentage (%BF) (7%-20%); moderate %BF (20%-29%); and high %BF (29%-39%). As predicted, the leanest subjects also demonstrated the lowest insulin values while those with the highest percent body also displayed the highest insulin values (9.82 $\mu\text{U}/\text{mL} \pm 1.82$ vs. 11.43 $\mu\text{U}/\text{mL} \pm 2.51$ vs. 15.19 $\mu\text{U}/\text{mL} \pm 1.49$). Unexpected was the finding that the leanest subjects reported the highest caloric consumption while the highest percent body fat group was associated with the lowest total caloric consumption (low %BF=2228.48kcal; moderate %BF=1973.59kcal; high %BF=1729.46kcal). Two explanations may be posited for this discovery: 1) the information is false due to intentional or unintentional under-reporting or 2) the information is correct due to the increase of adiposity, which results in the release of adipocytokines that hormonally decrease appetite.

Follow-up testing on these subjects will may give us further insight into the causes of insulin resistance from a nutritional aspect, and give us a better understanding of the average college student's lifestyle and how it affects health.

Healthy or Tasty?: Perceptions of Food and How the Human Appetite is Fulfilled

Adrienne Curtis

Faculty Sponsor: Dr. Aimee Mark

The present research experiment was focused on exploring factors of healthy eating such as marketers who offer shoppers only healthy food samples or consumers who eat only healthy meals. When people taste a food sample described as "healthy" and "nutritious," they may report feeling hungrier afterward than people who taste the same food when it is described as "healthy." After the participants sample either the "healthy" labeled or "tasty" labeled food sample, they were asked if they wanted another snack to assess their level of satisfaction after the first food sample. It was expected in the present study that when restricted eaters consumed a food labeled as "healthy," they thought it was less satisfying and were more likely to eat much more to compensate than when they ate a food labeled as tasty.

Exploring the Perceptions of Yoga for College Athletes: A Mixed-Methods Study

William Davis, David Fosburgh

Faculty Sponsor: Dr. Brandon Eggleston and Dr. M. Jay Polsgrove

Yoga has become a popular way for many athletes to improve their physical and psychological health. However, little research has confirmed yoga as a form of training to complement or enhance athletic performance. This study explored both the perceptions of yoga among athletes and changes in flexibility.

Methods: Participants aged 18 to 22 years (mean age = 20.15 years) who were male college athletes (soccer or baseball players) participated in a 10-week yoga athletic training program. During the conditioning portion of their season participants (n = 19) took part in team-specific yoga sessions one time each week. After the completion of the yoga program for their respective sports, participants completed semi-structured elicitation interviews.

Results: Responses for questions regarding benefits of yoga were divided into two categorical themes: affective and physical. Perceived affective benefits included increasing body awareness (63%, N =12), increasing relaxation (53%, N=10), increasing camaraderie among teammates (47.4%, n=9), decreasing stress (37%, N=7), and increasing concentration (32%, N =6). Perceived physical benefits identified from interviews included increasing flexibility (79%, N=15), decreasing soreness (32%, N=6), increased energy (26%, N=5), increased awareness of breath (26%, N=5). Other benefits mentioned were increased quickness, reduced chance of injury, and shorter recovery time. When athletes were asked if yoga improved their performance in their sport, 16 percent (N=3) believed that practicing yoga improved them either directly or indirectly in their respective sport. Flexibility increased in the soccer team but showed limited improvement among the baseball pitchers. There was not a significant change in the control group.

Male college athletes believed that yoga provided many different affective and physical benefits after practicing for ten weeks. However, despite all participants reporting at least one physical and affective benefit, less than a fifth of participants believed that yoga practice improved their performance in their sport. There seems to be a disconnection between the benefits related to yoga and how these benefits improve sports performance. A possible explanation is that benefits related to yoga are not normally those emphasized in traditional forms of athletic training.

Classification of the Rhodopsin (Rh1) Gene in North American Catfishes

Jesse Derrington II

Faculty Sponsor: Dr. Rex Strange

Rhodopsin (Rh 1) is the light transducing protein of photoreceptive cells in the vertebrate retina. The rhodopsin protein has seven transmembrane domains similar to other G-coupled proteins. However, rhodopsin has a chromophore unlike other G-coupled proteins. The chromophore absorbs light energy and transfers the energy to rhodopsin causing a conformational shift in the protein. Interaction between the rhodopsin protein and the chromophore determine the wavelength sensitivity of the photoreceptor. Variation among the rhodopsins of different species is correlated with differing habitats and behaviors. The North American catfishes (Ictaluridae) include nocturnal species that may have unique rhodopsins as adaptations to an extreme photic environment. I characterized the Rh1 gene in five species of catfishes to understand better the nature of the rhodopsin of the Ictalurids. PCR amplification of the Rh1 locus yielded 618bp from which 206 amino acids were inferred. Of the 206 amino acids, 29 were variable among the sequences generated. A few of the variable amino acid sites were functionally important and may represent "tuning sites" that determine peak wavelength sensitivity of the photoreceptor.

Progress Toward the Synthesis of Novel Photochromic Molecular Switches Containing Dithienylethene

Nick Earls

Faculty Sponsor: Dr. Priya Hewavitharanage

Photochromic compounds change their color reversibly when exposed to different wavelengths of light. Among all the organic photochromic compounds, 1, 2-dithienylethene (DET) compounds are gaining ever-increasing attention due to their unique properties. DET can act as a molecular switch. When a fluorescent molecule is attached to the DET, fluorescence of the molecule can be modulated by switching on or off the DET molecule. The change of fluorescence can be used in optical data recording. These systems have advantages such as high resolution, high speed of data recording, and high storage capacity. The devices that use these compounds will be thinner, lighter, and highly energy efficient as well as much faster than the devices used today. We have designed novel photochromic molecular switches by covalently attaching DET to the fluorescent molecule BODIPY. Progress toward the synthesis of these novel molecular switches will be discussed.

Elementary Number Theory of Perplex Numbers

Preston Edge, Logan Schmitt

Faculty Sponsor: Dr. Adrian Gentle

Perplex numbers are those numbers of the form $a+bh$ where $h^2 = -1$, but h is equal to neither 1 nor -1 . Here h is referred to as the hallucinatory number and bh as the hallucinatory component of each perplex number. Our first summer of research was devoted to applying the number theory of rational integers to the perplex integers. We wanted, ultimately, to develop a fundamental theorem of arithmetic, essentially unique prime factorization, for the perplex integers. We began by defining prime for the perplex number system, and we settled on a definition which included all perplex integers which followed Euclid's Lemma stating that if ω is a prime number and $\omega|\beta\alpha$ then $\omega|\alpha$ or $\omega|\beta$. These perplex primes are irreducible, meaning they cannot be factored further, as are the rational primes that most people are familiar with such as $\{3, 5, 7, \dots\}$, and are of the form $((p + 1)/2) \pm ((p - 1)/2)h$ where p is a rational prime. There is another set of irreducible perplex numbers that do not follow Euclid's Lemma. These numbers, of

the form $(2n+1) \pm (2n-1)h$ where $n = 2^k$ and k is an integer and $k \geq 0$, are not prime but only irreducible. Perplex numbers that are the product of one or more irreducible non-primes often do not have a unique factorization, meaning that they factor into more than one set of perplex numbers that cannot be reduced any further. We developed a division algorithm and are currently investigating the sum of divisors and the count of divisors, all while trying to further our understanding of the irreducible non-primes and to develop patterns for their factors.

Hydrogeological Characteristics and the Stratigraphic Transition from Lacustrine Marl to Peat in a Riparian Wetland, Manistee National Forest, Michigan

Weston Ellis

Faculty Sponsor: Dr. Paul Doss

A shallow groundwater monitoring network in the Huron-Manistee National Forest of Central Michigan provides resource managers with long-term data on groundwater and surface water interactions within a riparian wetland-upland system. Continuously recorded groundwater levels, precipitation data, and stream discharge measurements help to characterize the linkage of a shallow unconfined and artesian aquifer with the headwaters of the White River. Weekly discharge measurements, taken during the 2010 growing season, range from 0.36m³/sec to 0.76m³/sec. Stage-discharge relations are complex during late summer; a rise in stage appears to correlate to declines in stream discharge and local groundwater levels. This increase in stream stage in the drier months is attributed to decreased velocities as a function of an increase in vegetation within the stream channel. The direct relation between stream discharge and wetland groundwater levels and field observations of numerous discharge points within the channel indicate that this section of the White River is dominantly sustained by groundwater. Groundwater levels in wells show seasonal water table fluctuations of 70 cm in the upland and 19 cm in the wetland. Evapotranspiration demands are significant during the summer months with water table declines as much as 3.5 cm/day within the wetland and 4.6 cm/day in the adjacent upland. Vibracoring within the wetland suggests that the local hydrostratigraphy is defined by a basal, well sorted, medium grained sand confined by an overlying sequence of lacustrine marl with abundant woody debris and shell fragments and a surficial peat. This stratigraphy represents outwash sand deposited during deglaciation of the Laurentide Ice Sheet followed by development of a shallow lake that transitioned into a peat accumulating wetland. Radiocarbon-age dating of basal peat indicates the lake-wetland transition occurred 6,050 +/- 203 yrs BP. AMS dating of a bivalve fragment at the sand-marl boundary and a wood fragment within the marl-peat transition is in progress.

Slope Stability and Soil Development of Cultivated Soils in Relation to Infiltration Capacity, Vegetation, and Runoff of Two Sites in Vanderburgh County, Indiana

Kaitlin Fest, Travis Hatfield

Faculty Sponsor: Dr. James Durbin

Soils are a nonrenewable resource taking hundreds to thousands of years to develop (Jenny, 1994). Assessment of factors contributing to erosion of soils is important in soil conservation, especially in areas with agricultural land use. Soil erosion occurs on naturally steep or man-altered slopes, hillsides with low rates of infiltration, high rates of runoff, and minimal vegetation. Cropland with a preexisting steep slope, moderate rainfall, excess tillage, and lower infiltration rates may be subject to higher rates of erosion. Infiltration rates were collected for two sites in Vanderburgh County, several weeks apart during the late winter/early spring of 2011. Site 1 had an infiltration rate of 2.64 cm/h, and Site 2 was 0.14 cm/h. These values may be different due to antecedent soil moisture conditions associated with dramatically different weather and farming practices between each collection date. Site 1 had an average gradient

(slope steepness) of 5.6% which was less than that of Site 2 at 12%. The data indicate that the quantified factors influencing soil erosion are different between the two sites. Site 1 did not have a dominant catchment channel whereas Site 2 had a channel 1-3 foot wide for water flow. The lack of a confining channel for runoff allows movement of water across the slope with the possibility of greater sediment loss. Quantitative measurements of erosion are in progress, but qualitative observations of erosion occurring at the two sites suggest that factors such as tilling practices, slope steepness and drainage patterns may have a greater influence on soil erosion than do infiltration rates.

The Effects of Driver Race and Gender on Civil Case Judgments

Sharona Fowler, Kelly Fitzgerald

Faculty Sponsor: Ms. Allison Skinner

Each year, 35 percent of civil cases involve litigation based on injuries resulting from car accidents, making automobile accidents the most common type of civil case (Langton and Cohen, 2008). The purpose of this research is to investigate potential jurors' beliefs about drivers involved in automobile accidents resulting from traffic congestion, investigating the influence of defendant gender and race (Asian-American or Caucasian) on perceptions of a defendant involved in an automobile accident. We expect the stereotype that Asians are bad drivers (Aokoi and Mio, 2009; Hein, 2000; Sue, Bucceri, Lin, Nadal, and Torino, 2009) may lead participants to allocate more blame to the Asian than the Caucasian driver. However, an alternative hypothesis is that participants might perceive Asian men as more feminine (e.g., Han, 2006), and thus as more careful and prudent drivers. In support, perceived femininity is associated with perceived diminished aggression, dominance, forcefulness, and willingness to take risks (e.g., Spence and Buckner, 2000) – all factors that might increase blame allocations in the context of car accident civil litigation. Thus, participants might attribute less blame to an Asian than a Caucasian driver because they perceive the Asian as a safer more cautious driver. Pilot studies support our alternative hypothesis that female participants perceived the Caucasian male defendant as more responsible for the accident than the Asian male defendant (Skinner, Stevenson, and Camillus, 2011), an effect mediated by a belief that the Caucasian defendant was a worse driver supporting the alternative hypothesis that Asian men may be perceived as better drivers than Caucasian men. For the current study, we plan to recruit a representative sample of community members to play the role of mock juror. The case will vary slightly from previous research, depicting an automobile accident resulting from traffic congestion, and will be followed by a series of items assessing perceived defendant blame for the accident and perceptions of both drivers. Participants will also be asked to complete items assessing attitudes and perceptions of Asians of and sexist beliefs, which we anticipate may serve as potential mediators

Cytoskeletal Protein Determination and Its Correlation with Cellular Motility in *Stemonitis Flavogenita*

Andy Frazee

Faculty Sponsor: Dr. Jeannie Collins

Antibodies against the antigens actin, actin binding protein 34, alpha actinin, alpha tubulin, beta tubulin, ezrin p81, gelsolin, kinesin 4 (head region), kinesin 5 (tail region), and vimentin were used to examine the protein extracts from the experimental organism *Stemonitis flavogenita*. The target antigens were cytoskeletal proteins thus being the foundation of cellular motility. The proteins extracted from *S. flavogenita* were analyzed using denaturing polyacrylamide gel electrophoresis, western blot, and slot blot analyses. Antibodies against actin, actin binding protein, ezrin p81, kinesin 4, and kinesin 5 crossreacted with proteins in the pellet sample. Antibodies against actin, actin binding protein 34, alpha tubulin, ezrin p81, kinesin 4, and kinesin 5 crossreacted with proteins in the supernatant sample. Proteins in the crude extract sample crossreacted with antibodies against actin, actin binding protein 34, alpha tubulin, ezrin p81, kinesin 4, and kinesin 5. Correlation to cellular motility will be presented.

Bladder Buzz

Amanda Harrawood, Tina Kraft

Faculty Sponsor: Ms. Sherri Mathis

Urinary incontinence from bladder dysfunction is a significant problem in nursing homes which is linked to negative health-related physical outcomes including pressure ulcers, disruption of sleep patterns, urinary tract infections, and falls. Through literature reviews and previous studies regarding urinary incontinence, the faculty mentors have determined a need for increased education to nursing staff and occupational therapy practitioners in long-term care facilities. The project, Bladder Buzz Building Blocks, expounds upon a previous project and consists of three major objectives: a) work with student researchers to analyze data, b) create Bladder Buzz Building Blocks kits for dissemination in nursing homes and assisted living settings, and c) develop a manuscript on related findings.

Promoting Walking to USI's Campus

Amanda Harrawood, Abby Schmitt

Faculty Sponsor: Dr. Catie Ehlman and Dr. Brandon Eggleston

Physical inactivity among college students is a significant public health concern. The college years are very crucial in developing lifelong behaviors such as incorporating the recommended amount of physical activity into daily routine. A survey was given to assess current attitudes about walking to campus from the apartments and dorms versus riding the bus, about how students felt the transportation system could be improved, and about how often students were walking to campus. Most students walked to campus on at least one day of the week and wanted to add more buses. To promote more physical activity at the University of Southern Indiana, the researchers implemented a social marketing campaign promoting the benefits of walking. The campaign promoted walking to campus instead of riding the bus emphasizing stress reduction, time savings, weight loss, and achievement of the daily recommended amounts of physical activity. The survey was re-administered after the social marketing campaign.

Distribution of Body Fat and Blood Lipid Levels in USI Freshman Students

Anne Hillyard, Jonathon Behrens

Faculty Sponsor: Dr. Mari Hopper

The college lifestyle typically includes poor diet and exercise habits as well as increased stress levels. Not surprisingly, this lifestyle is often associated with weight gain and other metabolic changes that place an individual at greater risk for the development of insulin resistance (IR). The goal of this study was to analyze the level and distribution of body fat (subcutaneous fat (SAT) and visceral fat (VAT)) and blood lipid levels including free fatty acids (FFA), triglycerides (TG), and both high density lipoprotein (HDL) and low density lipoprotein (LDL) cholesterol levels in incoming freshmen students. Twenty-six freshmen students, 12 men and 14 women, were evaluated during their first month of college. Following a 12-hour fast, blood samples were obtained and later analyzed. Height, weight, waist circumference, and percentage of body fat via skinfold were determined. Female subjects displayed higher percent body fat than men (women $29.7\% \pm 1.46$ vs. men $17.3\% \pm 1.58$). Waist circumference did not differ between women and men (women 78.6 ± 2.45 cm vs. men 76.4 ± 5.22 cm). Subjects were divided into two categories based upon percent body fat: low and high fat groups. Significant differences were observed in levels of FFA (low: 365 ± 55.8 vs. high: 523 ± 52.9), HDL (low: 44 ± 5.0 vs. high: 56 ± 4.4 mg/dL), LDL (low: 75 ± 9.9 vs. high: 101 ± 8.77 mg/dL), waist circumference (low: 75.2 ± 2.44 vs. high: 81.5 ± 2.47 cm) and insulin (low: 9.82 ± 1.82 vs. high: 13.2 ± 1.47 μ U/mL). When analyzing VAT vs. SAT, unexpectedly, SAT demonstrated a stronger correlation with insulin values ($r=0.45$) than VAT ($r=.37$). It will be of interest to track any changes in percent body fat and lipid levels throughout each subject's college career.

A Nicotine-Induced Conditioned Place Preference Paradigm in Larval Zebrafish

Sunny Huang

Faculty Sponsor: Dr. Jeannie Collins

Addiction encompasses complex traits that ultimately result in a dependence on the physiological and learned behavioral responses to a given substance of abuse. The physiological response to most substances is present during early development. The ability to examine relatively young animals like zebrafish larvae facilitates mutational screens examining genetic modifiers to behavior. Although assays exist to examine the physiological response to nicotine, little is known about the development of the learned behavioral response. We examined the onset of the learned response to nicotine using a conditioned place preference (CPP) paradigm in larval zebrafish. This was accomplished by placing larval zebrafish into a choice environment consisting of a petri dish with one side noticeably different from the other: ambient light with smooth texture or dark with rough texture. When given free choice, the larval zebrafish (4-6 dpf) showed a strong preference towards the environment similar to that in which they were raised, light and smooth, over that of a novel environment, dark and rough. After an initial preference was determined, zebrafish larvae were exposed to the less preferred environment paired with 10 μM nicotine. This paired exposure shifted the preference of the larvae towards the previously less preferred side. Using the CPP assay, in combination with gene-breaking transposon technology, we have been able to further explore nicotine dependence in the previously identified *bdav* mutant, a genetic locus that shows an altered physiological response to nicotine. With the standard CPP treatment and training, in the presence of nicotine, *bdav* heterozygote larvae did not develop as significant a change in preference towards the less preferred side. In contrast, control wild-type siblings with the same treatment and training showed a change in preference towards the less preferred environment. With gene-breaking transposon technology, larval-based CPP screening provides a method for discovering genes involved in complex behavior underlying addiction. This assay system may also be useful for identifying new small-molecule drugs (chemical genetics) that could serve as the basis for new behavior-modifying pharmaceutical leads.

Government Adjustments in Student Education Funding

Maria Jalilpour-Esfahani

Faculty Sponsor: Dr. Mary Hallock-Morris

The Higher Education Act of 1965 marked a fundamental change in how the United States government viewed education. Since being passed, the Higher Education Act has undergone many changes, and other pieces of legislation have also evolved from it. The United States government provides assistance in many forms to qualifying students who are enrolled in higher education each year through several different programs. The assistance provided by the government ranges from grants that do not have to be paid back all the way to subsidized and unsubsidized loans that have to be paid back. While researching this topic using qualitative case studies, I was able to put together a history of these programs as well as track the trends of these programs that will give an idea of where the futures of these programs lie among impending talks of cutting the United States budget foreducation funding once again.

Testing the Viability of Colonizing-Competent *Vibrio Fischeri* in a Nonculturable State

Ashleigh Janiga

Faculty Sponsor: Dr. Cindy DeLoney-Marino

The marine bacterium *Vibrio fischeri* has an exclusive symbiotic relationship with the Bobtail Squid *Euprymna scolopes*, newly-hatched juveniles of which must acquire the bacterium from the surrounding seawater. Previously Ruby and Asato determined the minimal number of *V. fischeri* cells required for 100 percent successful colonization of squid to be 240 CFU/ml. They also demonstrated that *E. scolopes* becomes colonized in seawater lacking this minimal number of *V. fischeri* CFU/ml, suggesting that the bacterium forms a viable, non-culturable (VNC) state that is still symbiotically infective. The researchers detected *V. fischeri* cells in seawater by a DNA hybridization assay for the *V. fischeri* specific gene *luxA* at a 100-fold greater concentration than the number detected by CFU/ml counts. We investigated the progression of VNC *V. fischeri* development in seawater by tracking decreasing CFU numbers, morphological changes, and maintenance of viability of the bacterium over time using a commercially-available fluorescent live/dead assay. This assay allows for both microscopic observation and determination of the integrity of a bacterial cell's membrane by either exclusion or uptake of the fluorescent stain propidium iodide. Initial studies in our laboratory have demonstrated the transformation of *V. fischeri* cells in seawater from ca. 100% viable rods to ca. 30% viable cocci occurred over 72 hours, while the concentration of CFUs/ml in the culture dropped by a magnitude of 1000-fold during the same time period. We repeated these experiments along with colonization assays through a collaboration with Dr. Mark Mandel at Northwestern University in Chicago, IL, to test the ability of the VNC state of *V. fischeri* to colonize juvenile squid. Results of these studies will help aid our understanding of the role of VNC microbial symbionts in establishing a symbiosis with an animal host.

Celtic Cultural Connections Between England, France, and Ireland

Traci Johnson

Faculty Sponsor: Ms. Patricia Aakhus

The objective of my proposal is the study of cultural artifacts from England, France, and Ireland all within the realm of the Celtic culture. Artifacts that were researched all came from the collections at the Pitt River Museum in Oxford, England, and the British Museum in London, England. The artifacts I studied, used for medicinal, magical, and everyday purposes in France, Ireland, and England from antiquity through the modern period, suggest both in use and in form a Celtic provenance. Because these objects are not well documented or photographed, so they were on site in order to understand their cultural connections and origins. Research on such a broad range in geography and topic has not been a common research topic in the past and made for an exciting assignment.

Synthesis of Hydrogen Storage Molecules

Kristen Jones

Faculty Sponsor: Dr. Kenneth Walsh and Dr. Jeff Seyler

The use of hydrogen as an alternative fuel source for automobiles suffers from many issues, the principle one being the storage for the supply of hydrogen. A number of different solutions have been proposed using a variety of materials that contain hydrogen, but none adequately addresses the problem. A possible solution is the use of organic liquids combined with a metal catalyst that will react and release the hydrogen when needed. One possible organic liquid storage system is indole/perhydroindole. In order to investigate this system, an efficient synthesis of the perhydroindole nucleus is required. Our efforts towards synthesizing the desired compound will be presented.

Adapting the Reactions Toward a Dithiepin-Based TNT Host Molecule

Joseph Kawa

Faculty Advisor: Dr. Edmir Wade

The objective of the research project is to synthesize a dithiepin-based host molecule. This dithiepin-based molecule will be highly conjugated from its sulfur lone pair to its aromatic rings. The highly conjugated systems make these structures extremely UV active. This electronic property would potentially change upon binding to its particular targeted guest molecule such as nitrotoluenes. Monitoring this change in UV absorption provides a way of detecting nitrotoluenes and potentially trinitrotoluene (TNT). Targeting TriNitroToluene (TNT) has future implications in the detection of TNT for security purposes as well as forensic cases involving the use of explosives. Currently, the components required to assemble the host molecule have been synthesized, and we report the development of a model synthetic scheme which will be employed to combine the various components and synthesize the dithiepin-based host molecule. Our optimized model synthetic scheme proceeds through a triacetalization followed by six-fold addition of a lithiated dithiane to dialdehydes and concludes with a dehydrative ring expansion. The model reaction scheme will elucidate the ideal conditions for the synthesis of the potential TNT Detector.

Piggy-Back Back Pack Program

Tina Keltner and Mindy Prien

Faculty Sponsor: Dr. Iris Philips

Often children in Evansville have inadequate access to food at home. School breakfast and lunch programs address this issue by providing nutritious food to low-income school children. The National Weekend Back Pack Program has extended school age children's access to nutrition over the weekend. Often this may be the only food in the home and participants share their food with younger siblings.

This project targeted low-income pre-school children age 1-5 in a pilot program similar to the Weekend Back Pack Program to provide food during the weekend. This program worked with community stakeholders to address a priority social issue: hunger. The pilot program assessed the feasibility of such a project in one Evansville day care. The findings from the project have been instrumental in refining the program, gaining financial support, and developing community awareness.

According to the Tri-State Food Bank, it costs \$150.80 per child each year to provide food for the weekend school program. Dedicated volunteers donated the personnel time necessary to prepare and coordinate the program. Funding from the Endeavor Project Award provided food to nearly 17 pre-school children. More importantly, the pilot program evaluated the design, funding, and implementation of possible future Piggy Pack Back Pack weekend nutrition to pre-school children.

While feedback from participating families and teachers from the day-care facility was at times difficult to obtain, we were able to utilize and analyze what was available. These findings may be used as a cornerstone to attempt to implement similar programs in other locations.

During the presentation we will disseminate the results of the surveys obtained from parents and teachers, the process used to implement the program, the progression of the program, and volunteer feedback.

Amotivation and Obstruction of Workflow in Bicycle Service Shops

Andrew Kern

Faculty Sponsor: Dr. Sid Hall

What began as an ambitious, objective study of an underrepresented population slowly devolved into an exploratory pretest of said population. The present study initially aimed to answer the question as to what factors, if any, would cause bicycle mechanics to delay the amount of time it takes to complete a service job. Such factors included bicycle condition, familiarity of the customer, type of service to be completed, etc. However, due to the limitations faced by the researcher in collecting data to measure those variables, the study shifted its focus to understanding the mechanics' perceptual likelihood to show preference to certain customers on the basis of need, age, loyalty, etc. and how likely a mechanic would be to complete a service job "on the spot." Data were collected via spreadsheets provided to the shops to assess the significance of service type and bicycle condition on the amount of time it took to complete a service job. An online survey was then sent to participating mechanics consisting of hypothetical situations and open-end responses to gauge the perceptual aspects of the study at the individual level. The present study found that the type of service significantly affected the amount of time to complete the job and whether it would be completed "on the spot." In addition, age appeared to be a factor when considering completing a job ahead of others, but only when the customer was a child. Although the present study deviated from its original goal, the results indicate that a more in-depth and comprehensive data collection method would be necessary to answer the original question: incentivizing the participating shops, direct observation, interviews. As not much information has been collected on the tendencies of bicycle shop mechanics, this study could serve as a benchmark for future research. If done correctly, the data could inform customers of best practices in interacting with mechanics and also the best practices for shops to improve customer service and satisfaction.

Determination of Physiological Factors Influencing Development of Disease in College Freshman Students

Jessica Lingafelter, Michele Sievers

Faculty Sponsor: Dr. Mari Hopper

College lifestyle is typically accompanied by weight gain and may place one at greater risk for the development of insulin resistance (IR) and disease in general. The aim of this study was to establish a baseline measure of various factors known to influence the development of disease in incoming college freshmen students. During their first month of college, 26 freshmen students (12 men and 14 women) were evaluated. Following a 12 hour fast, subjects reported to the laboratory for determination of blood glucose, insulin, free fatty acids (ffa), triglyceride (TG), high and low density lipoprotein cholesterol (HDL and LDL), body mass index (BMI), percent body fat (%BF), waist circumference, predicted VO₂ max, completion of a perceived stress scale (PSS) and a Block 2005 food frequency survey. Significant differences between males and females were observed in %BF, waist circumference, predicted VO₂ max, blood glucose, HDL, LDL, FFA, total calories, and fat consumption as a percentage of total calories. Males and females were further divided equally into two groups based on insulin values, high insulin vs. low insulin groups. It was discovered that subjects in the high insulin group also displayed significantly higher BMI's, %BF, TG and LDL levels. These data provide a baseline measurement that will allow tracking of these subjects over their four years of college. This study also engaged undergraduate students majoring in science as both subjects and student investigators.

Necessity and Hostility: A Tale of Two Mystic Spears

Alex Love

Faculty Sponsor: Ms. Patricia Aakhus

In times of danger and turmoil brought on by either famine or war, man has looked to his intellect and tools to find the keys to his survival, but for confidence and security early man has often had to look beyond the physical nature of such items. A weapon to its wielder can become something much greater than the sum of its parts when belief that a higher power is entwined into these weapons. Any man can grasp a spear and find solace, but if that same man picks up a spear he believes to hold the power of his ancestors, he can find much more. He can find courage, power, and even heroism. Even in our oldest cultural stories this rings true. Achilles went to battle with no normal shield, and Arthur fought with no common sword. And even with no real mystical powers such belief has allowed man to accomplish things he had never thought possible, which brings us to our focus: two spears. Two spears may seem normal enough on the outside, but to the wielder of these spears, they meant so much more. Spears have historically held a duality to them. They can be used as an object of necessity, used as a tool of hunt to feed one's family or village, to nourish from that which was slain. The second part of the duality is that of hostility. Spears through many centuries have been a mainstay in the forefront of war. The two spears I have chosen reflect this. One spear for hunting, which for the purpose of my research I will refer to as "necessity," and the second for the purpose of warfare, which I will call "hostility." I will be examining many aspects of these two spears. I will be going into the cultural importance, their esoteric value, the belief systems which granted these items their extraordinary traits as well as the importance of the physical and symbolic components that form these items. I do this to further reinforce the need to research the esoteric importance of such artifacts.

Physical Representations of Worship in Hinduism

Heather Manley

Faculty Sponsor: Ms. Patricia Aakhus

This research seeks to bring a deeper understanding to the external ritualistic form of worship in Hinduism. By exploring different visual representations of Hindu artifacts, this investigation will serve to give a broader understanding of how Hinduism operates in physical form. Hinduism combines both mental and physical worship and thus can confuse non-Hindu observers. However, by comprehending how material worship leads to a better insight of mental worship, a deeper appreciation of Hindu practices can be reached.

This research will discuss many forms of worship and the artifacts used in worship. Such topics as the use of amulets in prayer and devotion will be covered. The presentation also examines many images of gods and goddesses and the purpose they serve in worshipping. Also to be discussed is the use of rosaries in connection with mantras and Holy Scriptures. An investigation of the puja ritual in the Hindu context will be discussed as well.

The presentation strives to enlighten audiences by developing a deeper understanding of physical representations within Hinduism that will expand the over knowledge of Hindu practices. The presentation will incorporate many images as well as scholarly sources to clarify how each physical item is used in Hindu practices. The research will also cover a brief description of Hindu ideologies and geographical information that will better serve for the context of the artifacts discussed.

Cow and Veal Dung are Differentially Attractive to Dung, Rove, and Carrion Beetles

Luke Maurer

Faculty Sponsor: Dr. Eric McCloud

Dung beetles (Scarabeidae: Aphodiinae) are polyphagous, feeding on multiple types of dung. Some dung beetles have a high preference for cow dung, but few experiments have attempted to distinguish between different types of cow dung. We compared the attractiveness of grass-fed cow dung to veal calf dung. Beetles were captured in eight pairs of pitfall traps baited with veal calf dung and grass-fed cow dung. Grass-fed cow dung attracted significantly greater numbers of dung beetles while significantly greater numbers of rove beetles were captured in traps baited with veal dung. Carrion beetles were captured in traps baited with veal calf dung, but no carrion beetles were attracted to traps baited with cow dung. Differences in dung attractiveness may be due to olfactory cues.

Methods to Estimate the Localization Effects in One-Dimensional Disordered Photonic Bandgap Structures

Cody McGill

Faculty Sponsor: Dr. Glen Kissel

This poster contains optical engineering research involving localization of light in randomized periodic structures performed from the summer of 2009 to fall of 2010. The main focus of the research was to evaluate and compare various methods of computing one-dimensional optical localization effects for both a disordered quarter-wave stack and disordered non-quarter-wave stack models. One of the methods used to estimate the localization factor involved the use of Furstenberg's theorem. Furstenberg's theorem on products of random matrices tells us that the upper (and positive) Lyapunov exponent exists and is deterministic. This Lyapunov exponent is clearly identified as the localization factor (inverse localization length) for the disordered photonic bandgap structure. The Lyapunov exponent can be calculated via the Wolf algorithm which tracks the growth of a vector propagated by the long chain of random matrices. In the randomized models, layer thicknesses are randomized being drawn from either a uniform probability density function or a binary probability mass function. The other method used involved Furstenberg's integral formula, which involves integration with respect to the probability distribution of the elements of the random matrices and the so-called invariant probability measure of the direction of the vector propagated by the long chain of random matrices. This invariant measure can be determined numerically from a bin counting technique similar to the Wolf algorithm.

Sex Education in High School

Megan Miller

The purpose of the study was to learn the different experiences that young adults had regarding sex health education in high school and what their attitudes towards sexual health education are. Twenty participants were asked to participate. Individuals were interviewed between May and July 2009. Eligibility criteria for participating in this study were being of college age and being at least eighteen years old but not older than 30. The sample consisted mostly of white female college students. The mean age of the participants was 21.65 years ($SD= 1.5$) at the time of the interviews. All participants were either enrolled in college, had attended college for at least one year, or had already graduated with at least an Associate's degree.

Helping Others Understand the Financial Information Professions

Matthew Mitchell, Nicholas Marlin

Faculty Sponsor: Dr. Mehmet Kocakulah

The Lambda Mu Chapter of Beta Alpha Psi at the University of Southern Indiana has a growing commitment to helping others understand exactly what it is that financial information professionals do. The goals of the Lambda Mu chapter specifically lie in increased awareness in the financial information fields on campus and in the community through local high schools; increased membership in Beta Alpha Psi and the university feeder club, Accounting Club; increased number of students obtaining a bachelor of science degree in accounting, finance, and computer information systems at the University of Southern Indiana; and mentoring of lower-classmen in their pursuit of an accounting, finance, or computer information systems degree. The Lambda Mu chapter expects the overall chapter membership and community involvement to grow substantially, the number of students in financial information majors to increase greatly, and majors to better accountants through mentoring relationships and group studies.

All members of the Lambda Mu chapter are encouraged to be involved by actively seeking new candidates whether for Beta Alpha Psi or Accounting Club as well as for the financial information majors at the University of Southern Indiana. Those involved in mentoring and study groups will spend various hours on the project depending on the need of the individuals involved.

The overall benefits of the project are increased awareness of Beta Alpha Psi in the community, increased membership in the Lambda Mu chapter, and increased enrollment in financial information majors at the University of Southern Indiana. By increasing membership in the chapter, the capabilities and resources of the chapter will also increase. The members of the Lambda Mu chapter will increase the number of students in the financial information departments at the University of Southern Indiana, creating a need to keep improving the various departments, and ending in the production of better accountants.

Alpha Verses Beta C-H Bond Activation

Tulsi Modi

Faculty Sponsor: Dr. Jeff Seyler; **Volunteer:** Ms. Alice Kendall

Molecular hydrogen, H₂, is a promising alternative to hydrocarbon fuel for the future. Storage and on-demand production of hydrogen remains one of the challenges to this promise. Several researchers have demonstrated that iridium pincer complexes show potential for onboard generation of hydrogen from hydrocarbon sources. To study catalytic activity of these iridium-based complexes, it is common to use hydrogen acceptors in a transfer dehydrogenation process. An understanding of the mechanism in this process can aid in the development of new catalysts. We have used computational chemistry to model several processes believed to occur in the catalytic cycle. This presentation will provide our results comparing alpha and beta carbon-hydrogen bond activation in simple alkanes using iridium pincer complexes.

Thru-Hiking the Appalachian Trail

Becky Morris

Faculty Sponsor: Dr. Susanna Hoeness-Krupsaw

The Appalachian Trail, completed in 1937, is a 2,181 mile hiking trail that extends from Springer Mountain in Georgia to Mount Katahdin in Maine. In 1948, Earl Shaffer became the first person known to hike uninterrupted the entire length of the trail. Since then, more than 10,000 people have reported hiking the trail in one continuous journey or thru-hike. Every year, thousands of hikers attempt a thru-hike, but only one in four is successful. This project includes a series of blog entries, detailing the preparations and considerations for an extended hiking tour along the Appalachian Trail. This blog amalgamates selected contents of suitable publications to inform and assist prospective thru-hikers. The entries address physical and mental preparations, health and safety concerns, possible itineraries, equipment considerations and reviews, and supplementation. This project illustrates existing information with photo galleries and videos to provide an additional resource for potential thru-hikers and other interested readers.

That's So Gay!: Relationship Between the Use of the Word Gay as a Negative Term Unrelated to Sexual Orientation and Negative Attitudes Towards Homosexuality

Gandalf Nicolas

Faculty Sponsor: Ms. Allison Skinner

One of the most recent uses of the term gay is to refer to things as being lame, stupid, or negative in general (Lalor and Rendle-Short, 2007). This study focuses on evaluating the relationship between the use of the word gay as a negative term, perceived as unrelated to sexual orientation and attitudes towards gay individuals. In a first study, the correlation between explicit attitudes toward homosexual individuals, as measured using the Modern Homonegativity Scale (Morrison and Morrison, 2002), and implicit attitudes, as measured by the Implicit Association Test (Greenwald et al., 1998), and frequency of use and exposure to the word gay, as a synonym of lame, were determined. In the second study the effects of being exposed to the word gay as a synonym of lame or stupid on the activation of implicit attitudes were determined. Both studies provide a deeper understanding of attitude activation as it relates to homonyms, regardless of whether or not users of the term consciously associate both meanings of the word as is the case with the different uses of gay (Lalor and Rendle-Short, 2007).

The Prevalence of Insulin Resistance in USI College Freshmen

Evan Niemeier

Faculty Advisor: Dr. Mari Hopper

Insulin is a protein hormone produced by pancreatic β -cells in response to elevated blood glucose levels, and it is distributed throughout the body via the circulatory system. The main tissue beds sensitive to insulin are skeletal muscle, adipose tissue, and the liver. On delivery, insulin acts by binding insulin receptors on the cell surface. Through signal transduction, the insulin receptor starts a phosphorylation pathway that ultimately results in the regulation of a variety of metabolic processes essential for cell function. One essential function is the movement of the GLUT4 glucose transporters from the interior of the cell to the cell membrane. This allows the movement of glucose from the blood to the interior of the cell where it can be metabolized as a source of energy or stored intracellularly. Insulin resistance (IR) is a physiological condition that occurs when insulin-sensitive tissues become nonresponsive to insulin's action, resulting in elevated blood glucose and a disruption of a variety of cellular functions. IR is a complex condition that often occurs when adipose tissue becomes saturated, and fat accumulates in tissue beds that do not normally store fat. IR is often associated with weight gain, increasing BMI, poor diet, and stressful lifestyles, all of which are common themes in today's society, especially for college students.

Intramolecular Energy Transfer in a Novel BODIPY-Quinolate Co-Polymer

Prince Nzeata

Faculty Sponsor: Dr. Priya Hewavitharanage

Construction of polymers containing multi-chromophores is a promising strategy to obtain intramolecular energy transfer systems for various applications such as organic photovoltaic cells. 4, 4-Difluoro-4-bora-3a, 4a-diaza-s-indacenes (BODIPY) derivatives are ideal candidates for such systems because of their high fluorescence quantum yields, high absorption coefficients, and high stability. A novel polymerizable BODIPY compound was synthesized by replacing the two fluorine atoms on the boron center of the BODIPY with acetylene. The second polymerizable chromophore, bis (4-iodophenyl)boron quinolate was synthesized. The two monomers were co-polymerized by Sonogashira polymerization to yield a BODIPY-quinolate co-polymer. Excitation of the quinolate moiety resulted in emission of BODIPY moiety due to energy transfer from the quinolate unit to the BODIPY. The synthesis and photophysical properties of the novel polymer will be discussed.

Understanding Politicians' Use of Social Media to Manage Constituent Information

Lindsey Oakes

Faculty Sponsor: Dr. Carl Saxby

There is a strong consensus that Internet-based social media have the capability to affect political communications in general and an individual politician's campaign specifically. As of the 2010 election, however, not all political campaigns employed social media communication tactics. Despite the strong convergence as to the use of Internet communication – including social media – there is little understanding as to the specific factors that determine usage by individual politicians. This study investigates the factors that lead to adoption of social media by political candidates. This investigation extends research explaining small- and mid-size firms' adoption of Internet communications to the chain of variables explaining a politician's adoption of social media. Specifically, the study will explore politicians' use of social media as a function of degree of voter orientation in conjunction with perceived ease of use and benefit cognitions.

The research question is quite straightforward: What roles did degree of voter orientation, perceived benefits, and perceived ease-of-use of social media play in determining politicians' use of social media in the 2010 election cycle? Answers to this question can improve practitioners' (such as politicians and political consultants) and scholarly researchers' understanding of the social media adoption process. This understanding is the first step in maximizing effective use of social media in a democratic political system.

The research utilizes developed scales to measure a politician's degree of voter orientation, a politician's perception of the ease of use of social media, and a politician's perception of the benefits of social media. The study examines social media usage to disseminate and gather information from voters and donor constituency groups. Quantitative data collection will utilize a survey mailed to the politician's campaign office address. Data will be analyzed using regression analyses to test relationships between degree of voter orientation, the politician's perception of how easy social media are to use, and the perceived benefits of using Internet based social media.

Drug Panic, Moral Panic, or Both: Ecstasy in the Early Part of the Millennium

Stephen Oakley

Faculty Sponsor: Dr. Todd Schroer

Concern over the club drug ecstasy has increased and decreased dramatically over the past few decades. Ecstasy, which was relatively benign in the 1970s, attracted attention from media and politicians in the 1980s, starting a war against this substance. Two of the most visible groups creating concern over this drug were politicians and the media. Several legislative acts concerning this particular drug have been proposed since the 1980s, and the media has published many stories about this drug's user population and perceived benefits and harms. After looking at newspaper coverage over this issue as well as congressional records, it appears that this substance has become a concern intermittently throughout American history. Without looking at the motives of politicians or the media, the purpose of this research is to see if these two groups created a moral panic, a drug scare, or both concerning ecstasy. Newspaper articles and government reports will be analyzed to see if the concern about this drug was blown out of proportion to the damages it caused; or if the problem was not out of proportion to the problem caused, did these groups use a type of rhetoric to cause a scare.

Identifying Social Complexity in Prehistory through Craft Specialization and Stone Tool Production

Bradley Painter

Faculty Sponsor: Dr. Michael Strezewski

An important question for archaeologists when studying prehistoric societies is the level of social complexity and craft specialization that existed in the past. One means of measuring social complexity is the level of standardization in stone tool manufacture. Presumably, if tools were made in a very standardized manner, we can make the argument that there may have been specialists present who worked part- or full-time on this one task. The more time a craft specialist spent in his/her craft, the greater the societal division of labor. It is likely that craft specialists would have been allowed more time to devote to craftwork as opposed to growing and/or gathering food. This study is an attempt to unravel the question of craft specialization by looking at stone tools from two Mann Phase prehistoric sites in southwestern Indiana. Both sites date to the late Middle Woodland period (A.D. 100-500). The first site, Mann, is located in Posey County, Indiana, and is one of the largest sites in eastern North America. The other site, Kuester, is a much smaller habitation site and is located in Vanderburgh County, adjacent to the Ohio River.

Standardization in stone tool manufacture was assessed by comparing thirteen variables for each stone tool, specifically prismatic blades, which are long, narrow flakes of stone that were used for cutting. These thirteen variables provide important data on manufacturing techniques and the skill of the toolmaker. Presumably, the higher the skill and the greater the efficiency of the producer, the more standardized the final product would be. Results indicate that both sites had comparable and relatively high levels of standardization in blade manufacture. Interestingly, the blades at the two sites were found to have a much higher level of standardization than other large Middle Woodland sites in the region suggesting the presence of craft specialists not found elsewhere. In fact, the level of standardization at Mann and Kuester is comparable to very large, complex sites in Mexico such as Tula, the Toltec capital. These data strongly suggest the presence of part-time craft specialists at Mann phase sites in southwestern Indiana.

Stress and Insulin Resistance

Courtney Perry

Faculty Sponsor: Dr. Mari Hopper

The trend of increasing lifestyle pressures and decreasing physical activity in western societies has led to an increased incidence of stress-related diseases across many different age groups. A sustained stress response coupled with inactivity leads to sustained elevated blood glucose levels, which has been shown to lead to insulin resistance. This ongoing study examines the stress levels of college age students throughout their undergraduate careers using the Perceived Stress Scale (PSS). Their scale score is then matched with blood insulin levels to determine if there is a correlation. So far, only baseline testing has been done, and initial stress and insulin data show no correlation. The average stress scores for our men (13.3) and women (16.5) students were comparable to the normative national data for the 18-25 age group, but it will be of interest as the study progresses to see if and how their data changes and if insulin data change accordingly.

Explorations in Traditional Lithographic Methods Through Participation in the Frogman's Printmaking Workshop

Nathan Pietrykowski

Faculty Sponsor: Mr. Andrew Kosten

It is my intention at this year's USI Endeavor Undergraduate Research and Creative Works Symposium to present the results of my research grant, "Explorations in Traditional Lithographic Methods Through Participation in the Frogman's Printmaking Workshop." Prefacing my talk will be a brief introduction to the medium of lithography in order to familiarize the audience with the printmaking process. This will be followed with me discussing what I accomplished with the grant funds from purchasing equipment for the university's printmaking studio to attending the Frogman's Printmaking Workshop. Then my presentation will conclude with how the research grant helped my development as an artist and also how the materials acquired for this project will be available for future use by USI printmaking students for years to come.

Antifeminism vs. Feminism: Who Holds the Privilege in Society?

Rebecca Pitzer

Faculty Sponsor: Ms. Marla Mosher

In American society, privilege is repeatedly unrecognized by those who possess it. While most research focuses on male versus female privilege or evaluating privilege amongst races, I dove deeper into how privilege is obtainable via specific beliefs. Feminist pedagogy interprets social advancement much differently than antifeminist teaching, yet the two have conflicted in each wave of feminism. Antifeminism took a reactionary, patriarchal standpoint on many current issues while feminists usually advocated for social change. Both groups had varying levels of belief in regard to extremity within societal matters, but the latter remained: Antifeminists desired patriarchal movement; feminists aspired for equality. The conflict was more complex when sincerely held religious beliefs became involved with antifeminist identity. Using rational means defining privilege between the two ascribed statuses, my research attempted to discover for each identity, the amount of privilege each holds in American society. Through an extensive literature review of explicit and implicit attitudes towards feminism and antifeminism, I compiled opinions based on previous research to draw conclusions about privilege. In completion of the research, I am still perplexed as to which group holds the most privilege overall, in our relatively religious society. My specific research

brought to light the fact that privilege is highly complex, stemming from many angles. While it seemed that traditionalists have a patriarchal advantage, they may have an educational or financial disadvantage when compared to feminists. I categorized common stereotypes attributed to both groups, discussed their predictable origins, and challenged contradictory opinions through the privileges each group has obtained in American society.

Geomorphologic Analysis of a Drainage Basin Feeding the Proposed Constructed Wetland in Southwestern Vanderburgh County, IN

Adam Powell, Tina Bledsoe, Morgan Devine

Faculty Sponsor: Dr. James Durbin

The University of Southern Indiana (USI) and the Indiana Department of Transportation (INDOT) are in the planning phase of constructing a wetland on university property in Vanderburgh County, IN. This research reports the quantitative and qualitative characteristics of the watershed that feeds the proposed wetlands. Factors addressed include land use, morphometric parameters, discharge behavior, and sediment transport. Discharge measured during a 0.7" rainfall on 11/16/10 was found to be 0.173 m³/sec at the location furthest downstream. Suspended sediment in the trunk stream was measured and calculated to be 16,441.92 Kg/Day. Bedload sediment mobilized by the 11/16/10 event was found to have an average grain size of 1.65 Phi (medium sand) at the upstream location and 1.36 Phi (medium sand) at the downstream location. Total volumes of sediment recovered were 430g and approximately 2.1kg respectively. The suspended sediment appeared to be silt sized. These results are not unexpected when source terrain is considered. The trunk stream dissects and erodes the loess-mantled Inglefield sandstone that is dominated by silt (loess) and medium grained sand. Although calculated suspended sediment totals per day are substantial, the precipitation event was not large and the stream did not achieve bankfull conditions. Larger rainfalls as well as land use practices will influence the sediment load and discharge of the stream. An accurate record of pre-construction basin characteristics and stream behavior will facilitate planning of the wetland, and provide future researchers a baseline for assessing potential changes to the area.

The Role of Hcp-2 in Neuronal Function in *Caenorhabditis Elegans*

Meghann Reardon

Faculty Sponsor: Dr. Landon Moore

Many cells respond to severe DNA damage by undergoing programmed cell death; however for neurons, cell death has consequences for the organism including changes in behavior. How neurons respond to DNA damage and how these changes affect behavior are not well understood. We have developed a system using the model organism *Caenorhabditis elegans* to study the role genome stability genes play in neuron function. *C. elegans* works well as a model organism in that it is comprised of only 959 cells, 302 being neurons. The holocentric protein (hcp)-2 gene along with its paralog hcp-1 are known to play a role in maintaining genome stability by regulating chromosome segregation during mitosis. The hcp-1 gene is also the homologue of the CENP-F gene in humans. The CENP-F gene codes for a protein that is associated with the centromere-kinetochore complex. Here we show that a mutation in the hcp-2 gene, which removes 426 amino acids of the HCP-2 protein, results in a defect in viability following exposure to DNA damaging agents. Furthermore, homozygous mutant worms exhibit defects in behavior including lethargy and chemotaxis. We are using this hcp-2 mutant to study the effects that stressors such as UV damage and alkylating agents have on neuronal function through tests such as chemotaxis assays. This work will further our understanding of genes that link DNA repair and genome stability with neural function.

Reductive Amination Using Formic Acid under Mild Conditions

Brad Roberts

Faculty Sponsor: Dr. Kenneth Walsh

Reductive Amination is a two-step synthetic method used in the conversion of ketones and aldehydes into amines. The Leuckart-Wallach Reaction has shown that formic acid can be used as both a catalyst and a reducing agent for this type of reaction. However, the Leuckart-Wallach Reaction has for the most part been only performed using formamide and a few substituted formamide derivatives or with amines and carbonyl compounds at high temperature. The method we have developed is a milder synthetic procedure which involves slow addition of the formic acid to a solution of the amine and carbonyl at much lower temperatures without the use of more hazardous chemicals such as sodium cyanoborohydride or heavy metals which are normally used in reductive amination reactions. This method produced high yields of pure amines using several cyclic, straight chain and aromatic amines with aromatic aldehydes and cyclic ketones.

Before the Rain: Creating a New Musical

Kyle Rupert, Ashley Riester

Faculty Sponsor: Mr. Lenny Leibowitz and Ms. Amy Estes

Every year, new musicals are introduced on and off Broadway. Rarely does a college student receive the opportunity to be a part of the intense and grueling creative process that leads to a successful production. During the spring of 2010, we were fortunate enough not only to witness but also to participate in the shaping of a new American musical, *Before the Rain*. From dramaturgical research and copying script and score revisions to contacting potential financial backers and stage managing a staged reading, our week in New York City offered insight into the integral workings of a professional theatrical production.

The majority of our time was spent researching African-American culture in the 1930s. In order to assist with script and score writing, we focused on the influence of jazz and gospel music on the emergence of a distinctly artistic African-American culture. Though much of this research was completed before our week in NYC, once in the city, we were able to interview the Director of the National Jazz Museum of Harlem. The rest of our time was spent working directly with the theatre. Ashley stage managed throughout the rehearsal process and was responsible for keeping notes and coordinating rehearsal schedules. Kyle took on the role of associate producer and liaised the set up and usage of the performance space.

Because our involvement with the show focused mainly on research regarding topics covered within the script, we plan to discuss our findings and the different sources from which they were acquired. We also intend to have current USI theatre students perform musical selections from the show affected by our research. To accomplish this we will be splitting our presentation into two fifteen minute blocks; the first will involve a discussion of our research while the second block will feature the performance.

High Altitude Balloon Competition Pod

Kenneth Schnautz, Dakota Scheiber, D.J. Horstman, Erik Davis

Faculty Sponsor: Dr. Glen Kissel

The University of Evansville is hosting a High Altitude Balloon competition on April 16, 2011. The objective is to design and construct a device to be suspended from a high altitude balloon during its 90,000k ft. (27km) flight. This device should be capable of gathering data throughout the flight using on-board sensors, taking variable rate photography, and deploying a "flag" within a specified altitude range.

Our pod relies on a various sensors, a GPS, camera, and actuators, all connected to a microprocessor which stores data onto a portable USD card. The pod is being tested during a tethered balloon test and a flight after which it will be entered and flown in the competition at the University of Evansville.

Classroom rocks: A Service-Learning Project to Increase Pedagogical Tools for Local Earth Science Teachers and K-12 Students Interested in Geology

Kristen Schmeisser, Ashley Altheide

Faculty Sponsor: Ms. Carrie Wright

Got rocks? Many K-12 teachers do not. Physical interaction with rock and mineral samples in the classroom is important in getting students excited about geology and promoting their learning. Surveys by the authors of local K-12 teachers confirmed that these teachers do not have access to quality rock and mineral samples. Subsequent surveys found that these teachers would be interested using university-owned rock samples through a free lending program available through USI. The purposes of this are to make high-quality samples readily available to local teachers and to engage K-12 students in the geosciences through hands-on interaction with these samples in the classroom and through dynamic, inquiry-based labs and activities utilizing these samples. We collected quality rock and mineral samples and organized them into educational rock kits with relevant, inquiry-based lesson plans that meet many state educational standards. Samples and fossils were collected from local sources to impart a sense of geology in one's "backyard." Samples of rocks rare in Indiana, such as igneous and metamorphic samples, were collected in the American West on a major field excursion. The educational kits include thin-sections of a many of the samples collected, and the slides will be available along with petrographic microscopes. Detailed guides with descriptions of all the included samples and lesson plans utilizing the kits were developed. Details of the guides and lesson plans, plans for the authors to test the educational kits in local classrooms this spring, and plans to test the kits on K-12 teachers at a local summer training workshop will be presented. The kits will be available to area schools via the Southwestern Indiana Science, Technology, Engineering, and Mathematics (SwiSTEM) equipment lending trucks. This project is made possible through the SwiSTEM EURP. Major details of these two unique programs will also be included.

Synthesis of Dehydrogenation Catalysts

Jacob Schneider

Faculty Sponsor: Dr. Jeff Seyler

In today's society, the push for a "greener" society exists. This has led to pressure to find alternative fuel sources. One such source is hydrogen, but the current methods for storing hydrogen are expensive and dangerous. Several research groups have demonstrated that an iridium based pincer complex is capable of reversibly converting alkanes to alkenes and hydrogen. These systems are sensitive to air and require the use of an argon atmosphere to generate the hydrogen. When nitrogen is present, the iridium catalysts form unreactive dimers. We proposed the synthesis of an iridium complex that contains cyclopentyl substituted pincer ligands in hopes it would prevent the formation of the dinitrogen dimer. To understand the synthetic procedures and catalytic process, the preparation of the known tert-butyl substituted pincer complexes was first attempted. Computational modeling was also used to help in the understanding of the different pincer complexes as well as the dinitrogen dimers that form. This presentation will summarize our efforts to synthesize the complexes and their use in catalysis reactions. It will also summarize computational modeling studies of the dehydrogenation catalysts and dinitrogen dimers.

New Methods for the Synthesis of Selenoglycosides

Alicen Schwartz

Faculty Sponsor: Dr. Kenneth Walsh

Carbohydrates are important components of natural systems. For example, glycoproteins are carbohydrates that are important for many cell-cell recognition events. The synthesis of glycoproteins and carbohydrates analogs provides useful tools for studying the structure and functions of glycoproteins. Useful carbohydrate intermediates to synthesize are selenoglycosides. These species are often used to synthesize O-glycosides and C-glycosides, important analogs and intermediates for studying glycoproteins. Current methods of synthesizing selenoglycosides are very expensive and can be very malodorous. We have developed a method that is much cheaper and more benign. This method uses a cheap reductant, Rongalite, to perform the key step of the reaction.

Wind Power Feasibility Study

Samantha Smith

Faculty Sponsor: Dr. Brandon Field

To determine the potential for wind power on a specific property, the wind speeds and directions at that property were logged over a three-month period with a ground level data logger. When the wind speed data was adjusted to reflect what will be the actual height of the turbine, analysis of this data confirmed that there could be sufficient wind present to justify the placing of a low speed wind turbine. Furthermore, a turbine with an ideal operating range for the winds at this property has been selected based on the frequency distribution of the wind speed. The estimated power output for that turbine has also been calculated as well as the buy-back period based on existing power consumption data for the property resident.

Creating an Acoustic Guitar

Ben Sutter

Faculty Sponsor: Mr. Rob Millard-Mendez

In my attempt to create a playable acoustic guitar, the challenge lies in transforming raw timber into a finely crafted musical instrument. Much craftsmanship is involved in creating a playable instrument. One can easily create the general shape of a guitar, but is much more difficult to create a guitar that can play specific notes. Many variables are present such as correct bracing, neck angles, and bridge height. A guitar can be beautiful, but without the playability, is useless.

The research I have concluded recommends that much attention to detail is needed to create a fully functional guitar. There are many specific tools and jigs needed. I was able to rule out many variables by building specific jigs for bending the sides, gluing inside bracing, and attaching the neck.

Combining all of my research, I have created an assembly line of jigs for future guitars. This has been my second attempt, and I have been successful in finding the right methods with the help of USI. With my current research, I have researched and found the right techniques to make guitar-making a lifetime avocation.

Amuletic Occurrences of Flies in the Mediterranean and Their Interpretation

Amanda Turner

Faculty Sponsor: Ms. Patricia Aakhus

The fly is an insect of the most modest stature. It is small and unattractive, having no beautiful markings to inspire us and creating no song for us to enjoy. In the present day, the fly is considered commonplace at best, a creature below notice that gives way to such phrases as “fly on the wall”. At worst it is a nuisance and pestilent hazard worthy of extermination with a myriad of products created to do just that. The idea of making such a creature into an item of power such as an amulet would seem strange in light of so many other seemingly more appealing and deserving, options in the animal kingdom. It is even overlooked in modern academia with symbolic analyses being few and far between. In many civilizations, however, the fly was deemed not only important but also worthy enough to be a force of magic. In some cases they were a sufficient nuisance to require apotropaic amulets be created to ward them off much the way we now create special candles and chemical compounds to keep our barbecues safe. Some cultures felt that amulets had some desirable qualities or connections to the divine forces of the world—that the object was intended to create a link for the bearer. Some interpretations of the fly make it an agent to call upon the forces of disease and death, bringing them down upon one’s enemies or keeping them at bay. The lowly fly can also be used in some cases as a mark of valor and heroism in a great battle, a symbol of combatants’ contribution to their country. I will be examining instances of magical objects that are either in the form of or include flies as symbolic elements. I will be drawing primarily from artifacts of the ancient Mediterranean, most specifically from Mesopotamia, Greece, and Egypt. Then I will draw conclusions as to the intention of the object based on historical documentation, mythology, execution, location, and ownership. Through all of this, I intend to bring light to the under-appreciated, over-looked fly and its wealth of symbolism.

Repossessing Yourself: A Study of Exorcism and Psychological Relevance

Nicholas Yehl

Faculty Sponsor: Ms. Patricia Aakhus

It is common for many people to label the study of magic and superstition as unimportant. However, those were the ways that our ancestors understood not only the world but also humanity as a whole. In studying these ideas, we can gain a better understanding of the progression towards our modern science and possibly find hidden answers to questions gone unexplained. This presentation explores the concept of exorcism and its place as a pseudo-psychological practice for ancient peoples. Exorcism can be defined as the methods by which an invading spirit or force is removed from a person, place, or thing. In this report, I will cover exorcisms from Eastern and Western philosophy. I will cover the medical application of exorcism, the possible psychological nature of demon possession, and the methods by which demons or spirits were removed. For this qualitative study, I traveled to Oxford and London England, to visit various museums that contain artifacts and texts that would have once been used in exorcism rituals. In addition to the artifacts, I also researched methods of exorcism that come from Western and Eastern regions. The Eastern methods seem to have a greater basis in the medical and psychological realms while the Western methods rely heavily on religion, primarily the Christian faith. However variants of the Western exorcism use similar methods as the Christians, but they did not rely on their faith. In the Eastern tradition, it was not uncommon for a doctor to also be an exorcist. Here exorcism ran hand-in-hand with the development of medicine. In the Western traditions of exorcism, doctors and priests were two separate individuals. One was trained in the medicine, the other in magic. I will also postulate on the actuality of the supposed "demons" involved in exorcism. In many forms of exorcism, cross-culturally the "demons" involved affected the mind or body in some way. Whether they were removed via medical or religious exorcism doesn't change the idea that the exorcised individual may have been going through a form of psychological treatment. It is my goal to provide evidence in support of this notion.

A Multidimensional Fitness for Elementary Students

Caryn Yochum, Jason Boyle

Faculty Sponsors: Dr. Renee Frimming and Dr. M. Jay Polsgrove

Common trends suggest that U.S. children are becoming less fit. As health and fitness professionals we were interested in establishing positive fitness opportunities. From our perspective, social support and mentoring are valuable components to achieving positive health and fitness outcomes for youth. In our view, fitness opportunities that promote healthy exercise in a supportive and enjoyable way may propel students toward greater fitness. An afterschool program was designed to emphasize an integrated exercise program and was mentored by pre-service exercise science, health, and physical education students.

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