11th Annual Symposium

2012

USI ENDEAVOR! AWARDS *for* RESEARCH & CREATIVITY

University Center

University of Southern Indiana

www.usi.edu/endeavor

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Southern Indiana

April 2012

Dear Endeavor! Participant:

Welcome to the 11th 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,

Linda L. M. Bennett, Ph.D.

President

8600 University Boulevard • Evansville, Indiana 47712

University of
Southern Indiana

April 5, 2012

Dear Endeavor! Symposium 2012 Presenters and Sponsors:

Welcome to the 2012 Endeavor! Symposium. Your work has swelled the number of researchers and artists to more than 69. 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 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,

Jane Johansen

Director

Endeavor! Research and Creativity Awards.

Endeavor! Symposium Agenda

Thursday, April 5, 2012
University Center

8:30 – 9:30 a.m.	Check-in for all presenters and sponsors Receive programs and ID badges at front hall table
9:30 a.m. – Noon	Oral Presentations
1:30 – 2:30 p.m.	University Center rooms 205, 214, 215, 2203, 2205, 2207, 2217
9:30 a.m. – Noon	Poster and Artwork Sessions
1:30 - 2:30 p.m.	University Center, Carter Hall A-C Presenters of posters and art pieces will be available for one assigned hour
Noon – 1:20 p.m.	Lunch for Presenters and Sponsors provided by Endeavor! Research and Creativity Awards Program *Badges are lunch tickets!*
2:30 – 3 p.m.	Breakdown of all presentation and poster materials and objects

Endeavor! Research and Creativity Awards Committee

Jane Johansen	Professor of Business Communication, College of Business
Antonina Bambina	Director of the Honors Program, Assistant Professor of Sociology
Vaughn DeCoster	Associate Professor of Social Work, College of Liberal Arts
Khaled Elkhal	Assistant Professor of Finance, College of Business
Edie Hardcastle	Associate Professor of Biology, Pott College of Science and Engineering
Emily Lynn	Sponsored Research Specialist, Sponsored Projects and Research Administration
Rob Millard-Mendez	Assistant Professor of Art, College of Liberal Arts
Gabriela Mustata Wilson	Assistant Professor of Health Services, College of Nursing and Health Professions
Lindsey Olliver	Honors Program Administrative Assistant

Acknowledgements

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 L. M. Bennett, President University of Southern Indiana

Dr. Ronald Rochon, Provost University of Southern Indiana

Dr. Brian Posler, Associate Vice President for Academic Affairs

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Dr. Joneen Schuster
Ms. Jamie Seitz
Dr. Jeff Seyler
Dr. Samantha Smith
Dr. Susan Spencer
Dr. Rex Strange
Dr. Emir Wade
Dr. Carrie Wright

9:30 a.m. POSTER SESSIONS

Carter Hall

Kamille Bauer	Communities Making a Difference in Childhood Obesity Through Triathlon Training
Joseph Kawa	Development of a Dithiepin Framework for Novel Host Molecules
Alec Kelley and Christian Duncheon	Development of p53-Expressing DNA Plasmids to Study the Role of p53 in Centrosome Duplication Regulation
Evan Niemeier, Rachel Gahagen, Jonathan Behrens, Cassie Bedell	Changes in Physiological Indicators of Health in a Cohort of College Students Between Their Freshman and Sophomore Years

10:30 a.m. POSTER SESSIONS

Carter Hall

Morgan Devine and Kristen Schmeisser	Metamorphic Pressure-Temperature Analysis of the Gandaf Formation, Indus Sytaxis, Pakistan Himalaya
Whitley Draper and Brandon Baxter	The Woman with an Unusual Smile: A Case of a Fused Mandibular Lateral Incisor and Canine in a Pre-Columbian Amerindian from Southwestern Indiana
Jessica Heighton	Streambed Thermal Gradients in the Groundwater Dominated Headwaters of the White River, Manistee National Forest, Michigan
Mandy Jones	Person Centered Care Attitude Tool (Per-CCAT)
Amber King and James Wallace	Metamorphic Analyis of the Marghazar Formation Within the Kotah Come, Swat, Pakistan, Western Himalaya
Heath Kline	Distribution of Lythrurus fasciolaris, Lythrurus umbratilis, and their Hybrids in Southern Indiana and Northern Kentucky
Karl Moe	Investigating Chromatin Diminution in the Freshwater Lamprey Lampetra aepyptera
Ryan Voegerl	Fluvial History of Meander Abandonment in the Wabash River of Posey County, IN

James Wallace	Exploring Large-Scale Shear Fold Geometry Using Three-Dimensional Google Earth Modeling
Brett Williams	Determining the Actin Gene Sequence for the Slime Mold Stemonitis flavogenita
Ashtyn Zinn	Centrosome Abnormalities in NIH3T3 Cells Treated with Mustard Gas Analog, 2-Chloroethylethyl sulfide (2-CEES)

1:30 p.m. POSTER SESSION

Carter Hall

Whitley Draper and Brandon Baxter	The Woman with an Unusual Smile: A Case of a Fused Mandibular Lateral Incisor and Canine in a Pre-Columbian Amerindian from Southwestern Indiana
Michelle Harrell	Effective Mentoring Relationships with Women Working in Leadership Positions Within Intercollegiate Athletics: Results of a Meta-Ethnography, 1990-2011
Jessica Heighton	Streambed Thermal Gradients in the Groundwater Dominated Headwaters of the White River, Manistee National Forest, Michigan
Amber King and James Wallace	Metamorphic Analyis of the Marghazar Formation Within the Kotah Come, Swat, Pakistan, Western Himalaya
Heath Kline	Distribution of Lythrurus fasciolaris, Lythrurus umbratilis, and their hybrids in Southern Indiana and Northern Kentucky
Karl Moe	Investigating Chromatin Diminution in the Freshwater Lamprey Lampetra aepyptera
Megan Morrison	The Impact of Intercultural Service Learning on Ethnocentrism and Helping
Evan Niemeier, Rachel Gahagen, Jonathan Behrens, Cassie Bedell	Changes in Physiological Indicators of Health in a Cohort of College Students Between Their Freshman and Sophomore Years
Ryan Voegerl	Fluvial History of Meander Abandonment in the Wabash River of Posey County, IN
James Wallace	Exploring Large-Scale Shear Fold Geometry Using Three-Dimensional Google Earth Modeling
Brett Williams	Determining the Actin Gene Sequence for the Slime Mold Stemonitis flavogenita
Ashtyn Zinn	Centrosome Abnormalities in NIH3T3 Cells Treated with Mustard Gas Analog, 2-Chloroethylethyl sulfide (2-CEES)

PRESENTATIONS

University Center rooms 205–2217

	Room 214		Room 215	
9:30 – 9:50 a.m.	Teddy Clunie	Consonant Sounds in the Portoñol Language	Anuradha Asthana, Jonathon Yochum, Matthew Cooper, Stacy Warford	IMA Case Competition
10 – 10:20 a.m.	Lauren Deane	Politics and History of Spain—The Impact of Rule		
10:30 – 10:50 a.m.	Grisel Barajas-Espinoza	Faith is the Strength of Life	Sharona Fowler	The Impact of Obesity and Gender on a Civil Trial
11 – 11:20 a.m.				
11:30 – 11:50 a.m.	Rebecca Reynolds	The Association Between the Rosette Motif and Death in Ancient Greek Artifacts	Yihwa Beabout	Design and Synthesis of Novel BODIPY Derivatives for Fluorescence Cell Imaging
Noon – 1:25 p.m.	LUNCHEON			
1:30 – 1:50 p.m.	Samantha Smith	Wind Feasibility Study	Ashley Elpers	Food and the Maintenance of Culture in El Cibao Region of the Dominican Republic

	Room 2206		Room 2207	
9:30 – 9:50 a.m.	Walker Byer	Assimilation of Deities in Ancient Greece	Jacob Schneider	Needle in a Haystack: Computer Modeling of Iridium Pincer Dinitrogen Complexes
10 – 10:20 a.m.	Kristen Schmeisser, Ashley Altheide, Jessica Heighton, Caleb Gravemier	Schoolhouse ROCKS!: A Service-Learning Project to Improve K-12 Geoscience Education in Southwestern Indiana	Jessica Durkin	Spiritual Structures: Revealing Evansville's Heritage, Diversity, and Community
10:30 – 10:50 a.m.	Jonathon Neville	Death Penalty's Effect on Exoneration Rates	Erin Schmitt	Linguistic Features of Afro-Dominican Spanish
11 – 11:20 a.m.	Machiko Takayama	Roommate Conflict: A Comparison of International and Domestic Students	Ashley Riester, Andrea Hemmer, Craig Patterson	Technology and Storytelling: New Media and the Live Theatrical Event
11:20 – 11:50 a.m.	Louis Volz	False Head Behavior and Mechanics of a Temperate Butterfly: Experiment and Modeling	Chelsey Mullins	Musical Performance and Oral Traditions in the El Cibao Region of the Dominican Republic
Noon – 1:20 p.m.	LUNCHEON			
1:30 – 1:50 p.m.	Monika Wathen	The Effects of Racial Interactions on Self-Worth	Amanda Cleveland	Costuming Research and Acquisition for RENT Unique to its Origins

	Room 2217		Room 2218	
9:30 – 9:50 a.m.	Cody Matsel	Sustainable Energy, Women, and the Modern World	Kayla Burns	Teacher Misbehavior: A Predictor to Student Resistance
10 – 10:20 a.m.	Danielle Eckert	Designing Alternative Energy Systems in Jamaica	Logan Storrer, Samantha Smith, Brett Bielefeld, Patrick Elpers	ASME Sustainable Energy Vehicle Race
10:30 – 10:50 a.m.	Lauren Deane	Politics and History of Spain—How Franco's Rule Now Impacts Young People Especially and Any Emerging Young Franscisco Francos	Logan Storrer, Samantha Smith, Brett Bielefeld, Patrick Elpers	ASME Sustainable Energy Vehicle Race (cont.)
11 – 11:20 a.m.	Keri Larsen	Writing to Read: Student and Teacher Voice in Alternative Education	David Arnold, Jason Houseright, Braxton Edwards, Jake Elpers	2012 SAE Baja Vehicle
11:20 – 11:50 a.m.	Peter Williams	Racial Conflict Among Immigrant Haitians and Dominicans Within the Dominican Republic		
Noon – 1:25 p.m.	LUNCHEON			
1:30 – 1:50 p.m.			Cassie Eckerle	Assessing Critical Care Nursing: Evaluation of Care for Critically Ill Patients in South Africa

ORAL PRESENTATION ABSTRACTS

UC 205-2208

2012 SAE Baja Vehicle

Dave Arnold, Jason Houseright, Braxton Edwards, Jake Elpers

Faculty Sponsor: Dr. Paul Kuban

Two USI engineering seniors and the entire USI Baja Society of Automotive Engineers (SAE) student chapter redesigned, modified, and tested a single-passenger off-road vehicle to compete against other schools this spring. The two seniors performed this redesign of certain components for the 2012 USI Baja vehicle to fulfill their senior design requirement. SAE will host the competition in Auburn, Alabama, April 19th-22nd. USI's team will be one of 100 teams from around the world that will compete in a series of events including a four-hour endurance race and an acceleration event. The purpose of the competition is to create the best design for a vehicle at the lowest cost which is also able to be mass produced. The vehicle will be worked on and driven by members of the USI SAE team. The vehicle also must comply with the rules and regulations set forth by the SAE for this specific competition. These rules include specific frame dimension limits, the use of only one unmodified engine, as well as many safety constraints.

The project has been broken down into four main subsystems to redesign for the 2012 competition: suspension, drive train, brakes, and weight reduction.

IMA Student Case Competition

Anuradha Asthana, Matthew Cooper, Jonathon Yochum, Stacy Warford

Faculty Sponsor: Mrs. Jeanette Maier-Lytle, Dr. Brian McGuire, Ms. Jamie Seitz

The University of Southern Indiana has been participating in Institute of Management Accountant Student Case competition for the past six years. USI has finished in the Final Four for the last six years and has won the competition for three of those years.

The case competition has been very useful to learn accounting concepts beyond the classroom and to put theoretical knowledge into practice. This year's case presents a managerial accounting problem for an AAA Minor League Baseball team known as Pikesville Lightning. Its business has been prosperous during the baseball season, but the leadership is looking for a breakthrough idea which will encourage the local community to become more involved with the minor league baseball team during the off season. The owner has given this responsibility to its accountant and asked for thinking outside the box to determine a solution.

USI's team members analyzed the given financial numbers and suggested adding some entertainment alternatives to increase profitability during the off season. The team recommended evaluating the company with the Balance Scorecard and suggested some survey and performance appraisal techniques. They also utilized the given Strategic C-Framework to expand the accounting role on three different levers. Finally, they recommended Pikesville Lighting use social media as a valuable marketing tool to promote the team and its activities at a minimal cost.

Faith is the Strength of Life

Grisel Barajas-Espinoza

Faculty Sponsor: Dr. Manuel Apodaca-Valdez

While in the Dominican Republic, I researched spirituality, culture, and religion. I spent two weeks immersing myself in the local culture to better understand the spiritual belief system in El Cibao region of the Dominican Republic. Throughout my research, I discussed the different encounters I had with Dominicans and their explanation of their way of life. In my presentation, I strongly focus on the spirituality of the Dominican women. I share pictures that help me further explain the findings of my research. Through my research, I was able to learn to understand the impact the surroundings and the lifestyle that is led by Dominicans have on their religious views. The goal of my presentation and research findings is to bring awareness to students in the United States regarding culture and the importance of spirituality in the Dominican Republic.

Design and Synthesis of Novel BODIPY Derivatives for Fluorescence Cell Imaging

Yihwa Eva Beabout

Faculty Sponsors: Dr. Richard Bennett, Dr. Priya Hewavitharanage

Fluorescent (glowing) molecules have found a wide variety of applications in modern science and medicine. Fluorescence-based methods have become popular for non-invasive imaging of disease diagnosis. An extremely versatile BODIPY dye molecule is often superior to others due to many desirable properties such as high chemical and photo-stability, high absorption coefficients, and high fluorescence quantum yields. In addition, lack of a net ionic charge prevents them from interfering with charged molecules in the cell. We designed and synthesized several highly fluorescent BODIPY-based fluorescence probes for cell imaging. Details regarding the synthesis and the cellular uptake studies of these novel BODIPY compounds will be presented.

Communities Making a Difference in Childhood Obesity Through Triathlon Training

Kamille Bauer

Faculty Sponsor: Dr. Jay Polsgrove

Aimed at enhancing physical activity levels and health awareness of elementary students through varied tasks, social modeling, and peer support, a community outreach program to prepare elementary students for participation in a triathlon can be a potential way to reduce childhood obesity through engagement in a common goal. In this 12-week program, a community of USI faculty, students, and athletes worked together to help prepare elementary students to participate in a triathlon event held at USI. These individuals included professors and students from the Kinesiology and Sport Department enrolled in classes PED 487 and PED 402; Dave Enzler-Director of Recreation, Fitness, and Wellness; Mike Hillyard, USI Cross-Country and Track Coach and students from his team; and Jon Jacobs, USI alumni and National Champion Semi-Pro Cyclist.

Data collected related to physical changes and perceptual knowledge related to elementary student participation in triathlon preparation. A gait analysis, fitnessgram, and health survey was administered to test and assess the elementary students. Additionally, values of empathy toward providing community service were assessed on USI students.

Teacher Misbehavior: A Predictor to Student Resistance

Kayla Burns

Faculty Sponsor: Dr. Zachary Henning

For many years, scholars and educators alike have been researching and surveying why incivility in the classroom has been increasing in educational institutions across the country (Morrissette, 2001). There is little research concerning the possibility that classroom uncivil behavior or any form of misconduct could be triggered from the faculty themselves. Two hypotheses were created regarding this topic: Teacher misbehavior predicts student resistance; specific student resistance strategies can be predicted by one of three specific teacher misbehaviors. For the purpose of this paper, the argument will be made that a study should be conducted in order to investigate this relatively unexplored theory.

Assimilation of Deities in Ancient Greece

Walker Byer

Faculty Sponsor: Ms. Patricia Aakhus

The research to be presented concerns the diverse artistic representations of the goddesses Selene, Hekate, and Demeter and to consider how the variations may have impacted veneration and ritual in the religions of ancient Greece. Once separate entities, over time these deities were integrated and shared attributes such as the torch carried by Demeter and Hekate depicted frequently in classical sculpture and pottery from the 5th C BC. This study is an attempt to understand the process of assimilation concerning these figures in order to ease the difficulties in identification of artifacts. Photographic documentation and identification of images of Hekate, Selene, and Demeter in the context of place—veneration at specific sanctuaries and related votive objects—are to be presented in conjunction with an observation of primary text in order to understand the progression of this assimilation. Time was spent throughout Greece at various sites in Athens, Heraklion, and Delphi gathering data from sites and museums and briefly interviewing locals to obtain perspective of these figures.

Costuming Research and Acquisition for RENT Unique to its Origins

Amanda Cleveland

Faculty Sponsor: Ms. Shan Jensen, Mr. Eric Altheide

Much as a painter takes a brush to the canvas, theatrical designers and technicians paint a story on the stage. When it is finally displayed, the works of each individual designer and technical crew come together to create a series of artistic installments that express a story to an audience. As a costume designer, it was my job to help define the characters, setting, and atmosphere of the University of Southern Indiana's production of the historically important musical, RENT.

This research and creativity project provided access to a unique educational activity both in researching and in executing an important and challenging design. New York City is the epicenter of a unique cultural atmosphere vital to an understanding of the play at hand. New York was also the proper location to acquire fabric, accessories, and unique articles of clothing to suit the world of the play. Due to the unique production concepts of the show, costume acquisition at this site insured continuity between the media production and live stage production elements planned. All of these items were then used together in a composition that physically expressed an original design concept of my creation, much like a painter uses canvas and paints. Moreover, the trip to the city not only enabled me to attend the current Off-Broadway production, but it also enabled me to meet with the artists themselves and with other key designers and educators in my field of study.

Consonant Sounds in the Portoñol Language Spoken Along the Brazil/Uruguay Border

Teddy Clunie

Faculty Sponsor: Dr. Norma Rosas-Mayén

For this research project, I investigated the unique mixed language spoken in the twin border towns of Rivera, Uruguay, and Santana do Livramento, Brazil. These two towns share a permeable border that one can cross freely with no need to show a passport. This openness over time has allowed for the unrestricted development of a very distinctive language referred to by its speakers as "Portoñol." This language is also known by linguists as "Fronterizo" or "DPU" (Dialectos Portugueses del Uruguay). My project focused on the study of a small aspect of this language, more specifically the appearance of the seven consonant sounds that exist in Brazilian Portuguese but not in Uruguayan Spanish. I accomplished this through observations, semi-structured interviews with residents of Rivera and Santana do Livramento, and a word pronunciation test. Through the data I collected, I was able to determine which consonant sounds tend to appear in the Spanish spoken along the Brazil-Uruguay border that are typically absent from the more standard Rioplatense Spanish dialect spoken in Montevideo, Uruguay's capital, and Buenos Aires. The results of this project should provide groundwork for more extensive linguistic research on this unique language.

Politics and History of Spain—How Franco's Rule Now Impacts Young People Especially and Any Emerging Young Franscisco Francos

Lauren Deane

Faculty Sponsor: Dr. Manuel Apodaca-Valdez

This project researches the history of Spain's political leader Francisco Franco and the damage he caused his country and people that still influences new political leaders that arise. The research focuses more specifically on this question: How does Franco's rule now especially impact young people and any emerging young Francisco Francos? This project revealed many subfields beyond what I learned in my international studies classes: politics, history, economics, geography and Spanish as well.

My goal was to get a better understanding of the people's feelings about voting, especially now because they are currently trying/wanting to change the mechanics of the country. Using a series of questions to help me uncover attitudes toward obstacles and initiation into a new political system, I traveled to different areas in Spain including Pamplona Galicia, Extremadura, Alicante, Madrid, and Barcelona to look for likenesses and differences among the various geographical locations assuming some people would be more affected than others.

Metamorphic Pressure-Temperature Analysis of the Gandaf Formation, Indus Sytaxis, Pakistan Himalaya

Morgan Devine, Kristen Schmeisser

Faculty Sponsor: Dr. Joseph DiPietro

The Indus Syntaxis is a large south-plunging anticline situated at the northern edge of the Indian plate in the Pakistan Himalaya. The anticline is cored with Early Proterozoic schist, amphibolite, and granitic gneiss, and flanked with Late Proterozoic to Triassic (and younger?) schist, marble, amphibolite, and granitic gneiss. The rock units are truncated on their north side by the Kohistan fault and the Indus suture zone but extend southward without structural break into lower-grade rocks.

The Early Proterozoic Gandaf formation extends almost continuously the length of the Indus Syntaxis from the Indus suture zone southward to the main boundary thrust, a distance of about 140 km. The rock unit is metamorphosed to amphibolite facies in the north near the suture zone and green schist facies in the south near the main boundary thrust. We analyzed nine rocks from the Gandaf formation along a north to south traverse of about 75 km in order to determine if or how equilibrium temperature and pressure conditions vary with distance from the suture zone within rocks at the same stratigraphic level and of similar composition. All six rocks contain the assemblage garnet-plagioclase-biotite-muscovite-quartz with variable accessory minerals that include rutile, ilmenite, tourmaline, graphite, apatite, and chlorite.

Preliminary data suggest that temperature and pressure decrease from about 660 ±25 °C and 9 to 11 kbar near the suture zone to 600 ±25 °C and 6 to 8 kbar at a distance of 75 km south of the suture zone. The Gandaf formation is overlain by about 5 km of Proterozoic and younger Indian plate stratigraphy which, in turn, is overlain by ophiolitic mélange of the Indus suture zone. We attribute metamorphism to underthrusting beneath the suture zone mélange during Late Cretaceous-Eocene Himalayan orogeny prior to collision of the Indian plate with the Kohistan arc. Pressures indicate that the Gandaf formation was buried (subducted) to a depth of at least 22 km at a distance of about 75 km south of the present-day location of the suture zone.

The Woman with an Unusual Smile: A Case of a Fused Mandibular Lateral Incisor and Canine in a Pre-Columbian Amerindian from Southwestern Indiana, USA

Whitley Draper, Brandon Baxter

Faculty Sponsor: Dr. Susan Spencer

From 1964-1974, Indiana State University Evansville field school excavated an area of Posey County, Indiana, known as the Leonard site (12 Po 20), which included a prehistoric American Indian cemetery. Most of the remains were reburied, but fifteen were left unanalyzed and unpublished at Indiana State University in Terre Haute. Working with the skeletal remains resulted in a case study involving a middle to old adult female (B-12) with a fused mandibular incisor and canine. The AMS radiocarbon dating technique is preferred over radiometric dating for this project since it provides a more precise date using a smaller sample, and the results are obtained in a shorter amount of time. Earlier dates from the 1970s using radiometric dating for the site provided ranges that were too broad and extended incorrectly into modern times.

Spiritual Structures: Revealing Evansville's Heritage, Diversity, and Community

Jessica Durkin

Faculty Sponsor: Dr. Susanna Hoeness-Krupshaw

With a large spiritual community present in Evansville, Indiana, a variety of unique spiritual structures exists. The goal of this project is to preserve history through the medium of photography and present our city's hidden beauty online. In addition to a photographic catalog, an Excel document will be curated throughout this phase.

Initiation of the Spiritual Structures project will officially commence at the 2012 Endeavor! Symposium where Jessica Durkin will present the Spiritual Structure Vision Pitch to community members. Also during this time, 150 Spiritual Structure participation packets will be sent by U.S. Mail, formally inviting Spiritual Structure administrators to take part in the project.

This phase will require the assistance of local spiritual center administrators, primarily in reading the Spiritual Structures participation packet, accepting/declining the invitation, and scheduling the photography appointments.

After the photography appointments are completed, the photographs will be matched with topical historical research and point-of-interest captions, then published online via Flickr and SpiritualStructures.com.

Assessing Critical Care Nursing: Evaluation of Care for Critically Ill Patients in South Africa

Cassie Eckerle

Faculty Sponsor: Dr. Karen Parker

The purpose of this research is to assess the clinical practice in order to determine the model of care utilized by specialized intensive care nurses in South Africa. Intensive care nursing (ICN) is a constant and complex area of nursing that often demands nurses who are highly trained. In response to the dynamic environment of the intensive care unit, the Critical Care Society of Southern Africa (CCSSA) has developed a plan to lead a new trend in critical care nursing of South Africa in order to improve practice, management, education, and policy. Shortages and lack of funding for equipment and education have barricaded this improvement and directly affect the level of qualifications currently exhibited by intensive care nurses in South Africa.

Recent research by Beer, Brysiewicz, and Bhengu (2011) has identified gaps of the healthcare system in South Africa. The democratic government provides healthcare using the primary health care model that ensures every South African access to healthcare. This system has led to a nursing shortage due to the influx of patients and refugees from surrounding countries. This increases the workload and stress of the practicing nurses and allows room for medical errors and increased burnout rates.

Demographic data was collected on each participant. The primary investigator identified the qualifications held by specialized intensive care nurses at St. George Hospital of Port Elizabeth, South Africa. The qualitative data was collected using face-to-face, semi-structured interviews and participant observation in the hospital. Five descriptions of the day-to-day experience as an ICU nurse in South Africa. The nursing care provided to patients was observed and the model of care utilized was identified.

The critical care nurses at St. George's Hospital in Port Elizabeth, South Africa showed a team care effort. An emphasis on patient-centered care was made by all employees to increase satisfaction. All nurses were registered with the South African Nursing Council, and the council regulates all qualifications

Designing Alternative Energy Systems in Jamaica

Danielle Eckert

Faculty Sponsor: Dr. Peter Cashel-Cordo, Dr. Marco Lara Garcia

The impetus for our research is the continued presence of a lack of suitable options when implementing alternative energy sources, specifically in developing countries. Energy prices are increasing consistently throughout much of the global South, and often these countries pay more for energy then the global North. Alternative energy is the future. This includes wind, solar, and geothermal power which will, in the near future, being taking the place of fossil fuels such as coal and oil when the Earth's supplies of these resources become exhausted. By advancing the development of countries' alternative energy sources, humanity can get head start on the energy crisis. During spring break 2012, research was collected in Mandeville, Jamaica, at three orphanages. This research included taking pictures, notes, and readings of the meters, and capturing data that were useful in determining if alternative energy would be a feasible option. From the data collected and existing laws in Jamaica, an alternative energy system designed to supplement the existing consumption load seems to be the best option. This plan would work in tandem with the existing laws in Jamaica and lower the energy costs for the facilities researched.

The research shows that all three of the homes would benefit from solar power, and one of those three would benefit from wind power. With these alternative energy implementations, the orphanages should be able to produce enough to supply much of the power required for their facilities. In this way, energy costs should be reduced and, in turn, the orphanages would have more money to meet their children with other needs. The greatest challenge to implementing alternative energy is the initial cost, and therefore, grants and others sources of funding within Jamaica and throughout the international community should be explored. Alternative energy is not a future dream but a present reality, and if humanity hopes to cope with the current demands of energy consumption that exist, then research such as this could not be of greater importance.

Food and the Maintenance of Culture in El Cibao Region of the Dominican Republic

Ashley Elpers

Faculty Sponsor: Dr. Manuel Apodaca-Valdez

My project will inform the USI community about some popular foods and cooking practices in El Cibao region of the Dominican Republic. I will be presenting on some popular dishes in different areas of the country and explaining my research experiences while there. My presentation will include examples of popular dishes from each area I visited throughout the Dominican Republic. I will highlight certain spices and ingredients that are prevalent there. I will also speak about popular cooking methods in these areas.

Next, I will also speak to some of the herbal remedies my host family informed me of while I was there. Additionally, I will speak about which foods are enjoyed around holidays such as Easter.

I will conclude my presentation talking about my research methods and the results I obtained. I will talk about my successes and challenges in the field.

The Impact of Obesity and Gender on a Civil Trial

Sharona Fowler

Faulty Sponsor: Dr. Sid Hall

In a previous study, we investigated the influence of defendant weight on perceptions of a female defendant in a civil trial. Participants were shown a vignette of an automobile accident in which the driver was either obese or a normal body weight. Participants were then asked a series of questions to assess blame in the case. Given the negative perceptions of obese individuals along with evidence indicating that stigma can impact trial outcomes and legal decisions (Skinner, Stevenson, & Camillus, 2010), we expected participants to allocate more blame to the obese female defendant in comparison with a normal weight female defendant. Results indicated that, specifically, female participants blamed the obese defendant significantly more.

In the current study, manipulation of driver weight as well as gender will allow us to investigate a possible explanation for previous results: the "black sheep effect." This effect may cause participants to derogate deviant in-group members (Popan, Kenworthy, Barden, & Griffiths, 2010). We tested our theoretically developed hypotheses by measuring defendant blame as well as other possible mediators including perceived driver carelessness, responsibility, and driving abilities. We hypothesized that women judge the female obese defendant more harshly than men. In turn, men judge the obese male defendant more harshly than women.

Effective Mentoring Relationships with Women Working in Leadership Positions Within Intercollegiate Athletics: Results of a Meta-Ethnography, 1990-2011

Michelle Harrell

Faculty Sponsor: Dr. Glenna Bower

Women continue to be underrepresented in leadership positions within intercollegiate athletics. One of the most critical aspects of advancing women in leadership positions within intercollegiate athletics is the mentoring relationship. As the number of women entering sport increases, a growing number of professionals recognize the inherent benefits and challenges between the mentor and the protégé. This study was designed to identify themes based on key elements of an effective mentoring relationship to assist with the advancement of women within leadership positions in sport. A qualitative methodology, meta-ethnography, allowed the researcher to synthesize qualitative studies about mentoring women within intercollegiate athletics. These studies were selected by using both content and methodological screening. Each study was read, coded, and analyzed for themes based on the key elements of an effective mentoring relationship. The findings of the study revealed themes and implications for female protégés, potential mentors, and organizations to consider when mentoring women within intercollegiate athletics.

Streambed Thermal Gradients in the Groundwater Dominated Headwaters of the White River, Manistee National Forest, Michigan—North-Central Section

Jessica Heighton

Faculty Sponsor: Dr. Paul Doss

Using temperature as a tracer is a relatively new approach for determining volumetric flux of ground water and surface water interactions within a streambed. We deployed six thermal loggers at various depths including surface water and up to a half meter within the streambed of the White River in Manistee National Forest of Central Michigan. The White River, an important trout and salmon resource, is dominated by its groundwater base flow component of stream discharge. Stream discharge remains relatively constant overtime; few tributary streams are observed; and pronounced, discrete, and long-lived sand boils are observed in the streambed. Over the course of two days in early October, 2011, four loggers were placed in the littoral zone of the White River, and two data loggers were placed near the middle of the stream at a point of active and focused groundwater discharge. The littoral site remained deployed for the following three months. Surface water temperatures varied diurnally by as much as 5° C whereas streambed groundwater temperature varied generally less than 0.5° C. In the littoral zone, ground water temperatures were nearly a full degree higher than groundwater temperatures near the middle of the stream. Also, the littoral zone groundwater showed diurnal variations that the other site did not display in thermograph data. Data revealed that the half meter locations were generally cooler and more stable than the surface locations. Streambed groundwater fluxes determined from measured temperature gradients and compared with spatially variable head gradients measured through the streambed might assist in the development of a conceptual model that illustrates the mechanisms and heterogeneity of groundwater flux into the headwaters of the White River.

Person Centered Care Attitude Tool (Per-CCAT)

Mandy Jones

Faculty Sponsor: Dr. Katie Ehlman

The Omnibus Reconciliation Act of 1987 (OBRA '87) established minimum standards outlining resident rights and promoting quality of care in all certified nursing homes in the United States. Pursuant to this Act, Title 42 in the Code of Federal Regulations, Part 483, was written with a focus on the inherent right of each resident to "attain and maintain his/her highest practicable physical, mental, and psychosocial well-being." At the heart of this regulation is person-centered care. Person centered care, a care model developed by Kitwood, is a type of care based on elders making their own long-term care decisions based on personal desires and expectations. Person-centered care contrasts the traditional medical model care approaches and can be described as the foundation of the culture change movement in the nursing home industry. The theory of Katz's value-expressive approach expresses that basic values reinforce self-image. If nursing home staff members have a positive attitude toward person-centered care, they are likely to embrace the person centered care model in a care setting.

The purpose of the research project described is to develop a tool that measures the attitude of nursing home staff about person centered based on the work of Kitwood and Katz. Based on the literature review in the areas of attitude and person centered care, a ten sub-scale tool was developed measuring nursing home staffs' attitude toward person-centered care called the Person-Centered Care Attitude Tool (PerCCAT). The face validity of the PerCCAT was tested with 23 staff members from a for-profit mid-sized skilled nursing home. Content validity was tested with an international panel of experts on person centered care. This tool has the potential to help person-centered care change agents in the long term better know how "ready" staff is to adapt to person centered care models.

Multiple tools exist that measure the environmental structure of person-centered care; to the researchers' best knowledge, there are no tools that measure nursing home staff attitude toward person centered care.

Development of a Dithiepin Framework for Novel Host Molecules

Joseph Kawa

Faculty Sponsor: Dr. Emir Wade

The objective of this research project was to synthesize two target host molecules. Both hosts are ditheipin-based molecules which are highly conjugated from their sulfur electron lone pairs to their aromatic rings. The highly conjugated systems make these structures very UV active, which provides a method of detection for host/guest complex formation. Host 1 would be a reasonable host for targeting TNT. Host 2 is a potential Buckministerfullerene (C60) host.

Currently, all components necessary to assemble the two novel hosts have been synthesized. The overall synthetic schemes of both hosts are similar; therefore, a model synthetic scheme has been optimized and employed to combine the various components required for assembly of the individual host molecules. We report the progress toward the synthesis of each ditheipin-based host molecule. The fine-tuning of the synthetic model as it applies to the overall synthetic scheme of each host will lead to the success synthesis of each host molecule.

Development of p53-Expressing DNA Plasmids to Study the Role of p53 in Centrosome Duplication Regulation

Alec Kelley, Christian Duncheon

Faculty Sponsor: Dr. Richard Bennett

Centrosomes are tiny structures found in most cells, excluding bacteria, and are important for maintaining the genetic integrity as cells divide to produce new cells. Specifically, they ensure that each cell receives the same genetic information in both amount and content as its parent cell. Normally, there are only two centrosomes per cell. However, after a cell divides, the two new cells have only one centrosome. Since two centrosomes are required for cell division, the new cells must duplicate their single centrosome so that they can divide successfully. It is important that a cell duplicate its centrosome only once. If centrosome duplication occurs more than once, a cell can acquire more than two centrosomes, which can cause the genetic information between parent and daughter cells to be different. This change in genetic information is thought to be one way cancer progresses. Indeed, cells have mechanisms in place to regulate centrosome duplication. The tumor suppressor protein p53 has a major role in regulating centrosome duplication. However, its role is not fully understood. For example, p53 is known to localize to centrosomes, but the reason for its localization is unclear. In this project, we explain how we developed two p53-expressing DNA molecules called plasmids – one that expresses human p53 and one that expresses mouse p53.

Metamorphic Analysis of the Marghazar Formation Within the Kotah Dome, Swat, Pakistan, Western Himalaya

Amber King, James Wallace

Faculty Sponsor: Dr. Joseph DiPietro

The Marghazar formation, located in Swat, Pakistan, forms the base of the Alpurai group within the Kotah and Loe Sar domes. Unconformably above the Swat gneiss, the Marghazar formation is upper Permian to Triassic in age. The formation consists of amphibolite, quartzo-feldspathic schist, and schistose marble, and correlates with the Panjal formation of western India. The rocks form part of the Pakistan metamorphic belt at the northern edge of the Indian plate south of the Indus suture zone and Kohistan arc complex. Three rock samples from the Marghazar formation were chosen from different locations within the Kotah dome for metamorphic analysis to determine the approximate pressure and temperature of metamorphism. All three samples are quartzo-feldspathic schists with major minerals of quartz, plagioclase, garnet, muscovite, and biotite. Program GTB, Geo Thermo Barometry (Spear, F.S., and Kohn, M.J., version August 2006) was applied to calculate pressure and temperature using average garnet, biotite, muscovite, and plagioclase compositions. Peak temperature and pressure was calculated at approximately 640° to 670° Celsius and 10.9 to 12.4 kilobar. AFM diagrams were plotted to determine degree of equilibrium in each of the samples. Coexisting garnet and biotite compositions from all samples plotted approximately parallel indicating near equilibrium conditions. Thin section analysis showed sharp biotite-garnet contacts, a further indicator of equilibrium. Calculated temperature and pressure conditions are close to the lower limit of eclogite facies metamorphism which is consistent with field data that suggest metamorphism resulted from subduction beneath the Indus ophiolitic mélange prior to collision with the Kohistan arc complex.

Distribution of Lythrurus Fasciolaris, Lythrurus Umbratilis, and Their Hybrids in Southern Indiana and Northern Kentucky

Heath Kline

Faculty Sponsor: Dr. Rex Strange

The Scarlet Shiner (Lythrurus fasciolaris) and Redfin Shiner (Lythrurus umbratilis) are closely related cyprinids with adjacent and overlapping distributions in southern Indiana and northern Kentucky. However, the broad contact zone between the two species shows a complicated geographic pattern of L. fasciolaris, L. umbratilis, and populations of hybrid origin. We used a combination of morphological characters and mtDNA markers to better ascertain the structure of this contact zone. A comparison in morphological characteristics determined that the populations of L. fasciolaris and L. umbratilis were relatively unchanged from recent publications. In contrast, the analysis of mtDNA markers showed an expanded area of hybridization within the central portion of southern Indiana. This suggests that there has been a history of interbreeding within these populations but with little change in their morphology.

Writing to Read: Student and Teacher Voice in Alternative Education

Kari Larsen

Faculty Sponsor: Dr. Paul Parkison

Writing to Read: Student and Teacher Voice in Alternative Education contributes to the literature by increasing understanding of student and teacher experiences within an alternative high school. The study is based upon a writing workshop conducted at a local alternative high school and interviews of students and teachers. The outcome of the research is a book for publication.

Sustainable Energy, Women, and the Modern World

Cody Matsel

Faculty Sponsor: Dr. Oana Armeanu

The United Nations defines human development as leading long and healthy lives, being knowledgeable, and having access to the resources needed for a decent standard of living and to be able to participate in the life of the community. The United Nations categorizes four levels of human development: very high, high, medium, and low. High levels of energy production, particularly electricity, and consumption are prerequisites for achieving high levels of human development; however, one-fifth of the human population still uses forms of biomass such as wood to heat their homes and cook their food. These countries are overwhelmingly located in the global South.

Women are adversely affected by a lack of modern energy in that woman, throughout much of the world, are still forced into traditional roles within society—home maker. They are responsible for the energy production within the home, and therefore spend significant time collecting biomass for heating and cooking. As a result of understanding this correlation between energy and development, the United Nations created four energy priority areas which are used as a guideline to implement programs that ensure those living without modern forms of energy, with special attention to women, get the resources they need. In Bangladesh, the United Nations implemented a program introducing modern forms of lighting shifting from open flame kerosene lamps to battery operated lamps. The single greatest challenge facing humanity today is balancing energy production and human development.

Investigating Chromatin Diminution in the Freshwater Lamprey Lampetra Aepyptera

Karl Moe

Faculty Sponsor: Dr. Landon Moore

The goal of this project is to determine whether chromatin diminution is a developmental process among the class Agnatha. Chromatin diminution is the programmed loss of genetic content during development. Most examples of chromatin diminution are in invertebrates; however, recent evidence indicates that some basal lineages of vertebrates also undergo this developmental program. Chromatin diminution has been shown to exist in sea lampreys, Petromyzon marinus, and in hagfish, Eptatretus burgeri. This research examined whether a similar process occurs in the freshwater lamprey, Lampetra aepyptera. In sea lamprey, millions of base pairs of DNA are eliminated from the genome during the transition from germ-line to somatic cells. Two DNA sequences found undergoing chromatin diminution are GERM1 and SPOPL sequences. We determined whether similar sequences are present in the genome of Lampetra and whether those sequences also undergo genomic reorganization. Lampetra aepyptera is a non-parasitic freshwater lamprey that is found locally in Indiana and is currently being extensively studied with respect to their development and genomics. The presence of a predictable and extensive genome reorganization in a readily available source would make L. aepyptera a useful model to study the dynamics of genome stability and the consequences of reorganization in the context of normal vertebrate development and cell biology.

The Impact of Intercultural Service Learning on Ethnocentrism and Helping

Megan Morrison

Faculty Sponsor: Dr. Joneen Schuster

This study examined the effects of intercultural service learning on ethnocentrism and altruism. Twenty-one participants (6 men, 15 women) completed surveys one week before the service trip, one week after, and one month after the trip. Nine participants were in the experimental group while twelve participants were in the control group. Participants completed the GENE scale, the Helping Attitude Scale, and the Intercultural Willingness to Communicate Scale on all three occasions. In addition to these three scales, participants also completed an Intercultural Interaction Instrument to determine their previous experience with other cultures. Repeated measures one-way ANOVAs were used to interpret results. The hypothesis that intercultural service learning would have an impact on ethnocentrism or helping was not supported due to the non-significant main effects and non-significant interactions for helping, intercultural willingness to communicate, or ethnocentrism.

Musical Performance and Oral Traditions in the El Cibao Region of the Dominican Republic

Chelsey Mullins

Faculty Sponsor: Dr. Manuel Apodoca-Valdez

This research project focused on the study of how oral traditions or stories are involved in popular musical performance in the Cibao region of the Dominican Republic and how these traditions help the peoples of African descent in the region form their cultural identity. Popular musical performance, especially the dances of merengue and bachata, are thought to have originated from the slaves brought to the Dominican Republic by the Spanish and are a large part of Dominican culture. It is important to record oral traditions, because as the generations who tell the stories grow older, stories will become lost to the younger generations and to the world.

To record this information, I traveled to several sites in the Dominican Republic, mostly low-income neighborhoods, where I searched for musicians and dancers to interview. Due to a limited time frame and a set schedule, it was difficult to find experts on the topic. I interviewed ten people and observed and recorded several musical and dance performances; clips of these will form part of my presentation. I tried to get people to focus on stories told through music, but I was unsuccessful in recording any new stories. After gathering the data, analyzing it and translating it, I discovered that while the younger generations may not be preserving the oral traditions that go along with the dances, music itself still remains a large part of the Dominican cultural identity, especially among the African descendents. All of the interviewees agreed that music is very important to Dominicans and that is something that will never change. The music and dances themselves may change over time, but Dominicans will always sing, dance, and play music and consider it a large part of their culture.

Death Penalty's Effect on Exoneration Rates

Jonathon Neville

Faculty Sponsor: Dr. Garret Merriam

There is a traditional argument against the death penalty called "the argument from innocence." Dating back at least as far as Voltaire, it maintains that we should abolish the death penalty because of the risk that we may execute an innocent person. The only way to avoid such a miscarriage of justice is to not execute anyone (Bedau & Radelet, 1998).

We hypothesize by abolishing the death penalty, we may cause more innocent people to be punished for crimes they did not commit; miscarriages of justice may actually increase. It is our contention that this is a result of the surplus oversight that attends capital cases. Extra appeals, more lawyer hours, and other forms of oversight are given to death row cases in excess of that given to non-death row cases. If we abolish the death penalty, we reduce the amount of oversight and inadvertently cause more people to spend the rest of their lives in prison for crimes they didn't commit. Paradoxically, if we want to avoid miscarriages of justice, we should keep the death penalty.

The purpose of this study was to find evidence to support this hypothesis. Using a short survey, we asked if people are more inclined to donate money to help exonerate an innocent person on death row than they would be inclined to donate money to help exonerate an innocent person sentenced to life in prison.

Changes in Physiological Indicators of Health in a Cohort of College Students Between Their Freshman and Sophomore Years

Evan Niemeier, Rachel Gahagen, Jonathan Behrens, Cassie Bedell

Faculty Sponsor: Dr. Mari Hopper

College lifestyle is typically accompanied by weight gain and may place a student at greater risk for the development of insulin resistance (IR) and disease in general. This study reports the results of a follow-up trial in an original cohort of college freshman (eight men and eight women) at the end of their sophomore year, spring semester 2011. 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 & LDL), body mass index (BMI), percent body fat (%BF), predicted VO2 max, and completion of a perceived stress scale (PSS). Results show a slight but not statistically significant weight gain of 5.6±3.3lbs for females and 5.3±3.0lbs for males. Despite the increase in weight, circulating insulin values were not significantly different from values obtained in the first semester of the freshman year. Assessment of BMI indicates that five of the eight women and three of the eight men currently display BMI's > 25 which categorizes them as overweight. The degree of weight gain is of concern as continued, gradual gain over time will likely result in serious health consequences.

The Association Between the Rosette Motif and Death in Ancient Greek Artifacts

Rebecca Reynolds

Faculty Sponsor: Ms. Patricia Aakhus

This study was conducted to discern if the rosette motif is associated with death in Greek artifacts during the Minoan (2000-1400B.C.), Mycenaean (1600-1100B.C.), and Archaic (750-500B.C.) time periods. The study was also designed to compare and determine if there was a change in the meaning of the rosette motif between these three consecutive time periods. Artifact surveys were conducted at three locations: the Greek National Archeological Museum, the Museum of Delphi, and the Heraklion Museum. The data on these artifacts was then sorted by time period and their former locations within the Greek community. Enough data was collected to reveal trends during Minoan and Archaic time periods, but not enough to accurately support the hypothesis. The results support the association between the rosette motif and death during the Mycenaean time period.

Technology and Storytelling: New Media and the Live Theatrical Event

Ashley Riester, Andrea Hemmer, Craig Patterson

Faculty Sponsor: Mr. Eric Altheide

With the increasing need to bring in larger audiences, theatre companies have begun using new media technologies to broaden the demographics of traditional theatre goers. By combining the immediacy of film and the improvisational liveliness of theatre, these efforts by the theatre community have helped bring in newer, younger audience members. After researching current trends, we travelled to New York City to interview theatre professionals and see current theatrical productions using these new media techniques. Using the fall production of RENT as the foundation of our research, we developed and implemented a process of new media elements for the production, working from brainstorming through storyboarding through filming and post production. Following the regionally and nationally acclaimed production of RENT, we will be discussing our process of creation and showing musical excerpts from the production which used new media to help enhance the storyline and immerse the audience in the emotional and creative lives of the characters on stage.

Schoolhouse ROCKS!: A Service-Learning Project to Improve K-12 Geoscience Education in Southwestern Indiana

Kristen Schmeisser, Ashley Altheide, Jessica Heighton, Caleb Gravemier

Faculty Sponsor: Dr. Carrie Wright

Survey conducted by USI student Chris Grathler in summer 2009 found that local Earth science teachers do not have access to the quality rock samples they need. These teachers want access to better samples but lack funding to buy them and/or knowledge to collect samples themselves. Literature suggests physical interaction with samples enhances student understanding. Therefore, rock sets were compiled using area sedimentary rocks, igneous rocks and metamorphic from the Snake River Plain region, and sedimentary, igneous, and metamorphic rocks from Oregon and northern California. These rock sets are now on loan to local schools via the southwestern Indiana STEM trucks out of USI.

Six classroom sets of eight kits each were created: igneous, sedimentary, metamorphic, fossils, rock cycle, and rocks (and minerals) of Indiana. The rock kits are contained in plastic shoe box-sized tubs, and the tubs are placed in larger tubs for transportation. The kits and sets are all labeled with laminated pictures and titles. Costs for these materials were covered by Endeavor!

Lesson plans (K-8) were created for use with all the sets to meet modern state standards. In addition, lesson plans for topographic maps and geologic time were also produced. Various curricular materials were developed to accompany these lesson plans to assist in teacher preparation and help teachers present the information. These materials were reviewed by local teachers in a July 2011 workshop and revised according to many of their suggestions. These revised materials will be presented, along with example rock kits.

Linguistic Features of Afro-Dominican Spanish

Erin Schmitt

Faculty Sponsor: Dr. Norma Rosas-Mayén

My research project sought to answer the research question, what linguistic features are exclusive to Afro-Dominican Spanish in comparison with standard Spanish varieties? The research question sought to discover and document the distinctive linguistic features possessed by Afro-Dominican Spanish which differentiate it from all other Spanish varieties. My research is significant because it draws awareness to the stigmatization of Afro-Dominican Spanish language and culture, recognizes influences from African and surrounding Caribbean languages and cultures on the Afro-Dominican Spanish language and culture, addresses an area of study for which little research has been conducted, and works toward preservation of language and culture in Afro-Dominican enclaves.

Research was conducted in the Dominican Republic in June 2011 at bateyes, or sugar cane plantation communities, where Afro-Dominican Spanish is spoken. Informants were recruited and asked semi-directed oral questions so as to elicit speech for linguistic analysis. Speech was recorded electronically for later linguistic analysis upon return to the United States. To create data from the interviews, the Phonological and Phonetic Analysis sheet was utilized. Each interview (a total of 11) was replayed at least three times and analyzed linguistically at the phonological level. The pronunciation of /s/, / /,R/ in final position of the syllable, the pronunciation of /5/n/, and /d /, and /h/ or /x/ in initial position of the syllable,5/, /dS/, /tÆ/r/, / and stressed and unstressed vowels were all analyzed and recorded using the analysis sheet. Generalizations were then made about the norm of pronunciation for each phonological feature. Phonetic transcriptions of relevant words or phrases for each analyzed feature as well as the phonetic transcriptions of these words and phrases as pronounced in standard Spanish varieties were recorded on the Linguistic Feature Charts sheet.

Several non-standard linguistic features were found to be the norm in Afro-Dominican Spanish, including aspiration of syllable-final /s/, lambdacism /, [hr] pronunciation5/, aspiration of syllable-final /dRof syllable-final / of syllable-initial /r/, lengthening of stressed vowels, elision of a non-stressed vowel within a word, mutation of unstressed vowels, and the nasalization of vowels often accompanying velarization of adjacent /n/ in final position of the syllable.

Needle in a Haystack: Computer Modeling of Iridium Pincer Dinitrogen Complexes

Jacob Schneider

Faculty Sponsor: Dr. Jeff Seyler

Over the past several years, phosphine and phosphinite-based pincer ligands have been used for metal catalyzed reactions. PCP and POCOP metal complexes have shown significant differences in catalytic activity. A major setback when working with such complexes is their sensitivity to particular atmospheres. Reactivity of these pincer ligands is hindered by the presence of nitrogen forming dinitrogen dimers. Developing a pincer that can be used in a nitrogen atmosphere is important for industrial applications. We have used computational methods to examine the steric and electronic factors in various Iridium pincer dinitrogen complexes as well as their bonding interactions. We compared our methods of calculation with published experimental data and extended the work to include a number of hypothetical dinitrogen pincer complexes. This presentation summarizes our computational findings.

Wind 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 were adjusted to reflect what will be the actual height of the turbine, analysis of these 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.

Small-Scale Alternative Energy Relay Race

Logan Storrer, Samantha Smith, Brett Bielefeld, Patrick Elpers

Faculty Sponsor: Dr. Samantha Smith

The goal of this project was to make a system capable of competing in and fulfilling all of the requirements of the American Society of Mechanical Engineers (ASME) 2012 Student Design Competition. The competition states that teams should make a set of four vehicles, each powered by a different alternative energy source, that autonomously complete a relay race. Each car must travel three meters and after crossing a line, initiate the next vehicle. The cars may not be powered by combustibles, animal power, or nuclear power, and must be no larger than 4" by 4" by 8". The four power sources that were chosen by the team make use of pressure from compressed carbon dioxide, potential spring energy, potential gravitational energy, and electrical energy stored in a battery. Wireless communication was used by each vehicle to initiate the next vehicle. This method reduced the possibility of error by eliminating the need for contact or precise alignment of the vehicles. A team of approximately 10 students participated in this project, with seven students attending the conference and competition.

Roommate Conflict: A Comparison of International and Domestic Students

Machiko Takayama

Faculty Sponsor: Dr. Zachary Henning

This study investigated whether there are specific differences in conflict styles between international students and domestic students if they live with the same nationality roommates or different nationality roommates. To collect data, a questionnaire was used with hypothetical conflict scenarios. A total of 35 participants were recruited including American, Asian, Middle Eastern, European, and Hispanic students attending a small Midwestern university. The participants answered 20 questions related with to the roommate conflict scenarios. The dependent variable (which style is preferred, conflict approach or conflict avoidance, to solve roommate conflict) was calculated using a 5-point Likert scale (1= strongly disagree to 5= strongly agree). Results showed that international students are more likely avoid conflict, and domestic students are more likely to approach conflict when they live with a different nationality roommate.

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

Ryan Voegerl

Faculty Sponsor: Dr. James Durbin

The Indiana side of the Wabash River valley just northwest of Mount Vernon, Indiana, contains meander scars that indicate former channel positions that can be identified on aerial photographs and topographic maps and from field observations. This research examined four sediment cores collected from meander scars within the valley so that fluvial and lacustrine depositional processes and the timing of river channel migration/abandonment could be determined.

Two meander scars, chosen for cross-cutting relationships that allowed for relative age determination, were cored and sediment samples collected. Cores 1 and 2, located on former point bars associated with the channel from which Core 3 was collected, did not penetrate subsurface sand. Core 3, located within a channel scar 2.4 km (1.5 mi) from the modern river, contained clayey silt interbedded with sand, interpreted as rising- (sand) and falling-stage (silt/clay) flood deposits. A thinly-bedded clayey silt layer with laminar organics was observed from -1.96 to -3.25 m, and had an upper interval (21 cm) that was bioturbated indicating a lacustrine environment (oxbow lake). Core 4, located 3.7 km (2.3 mi) from the river, also exhibited clayey silt interbedded with sand. However, the laminar organics observed in Core 3 were absent in Core 4. Radiocarbon dating of wood and organic rich sediments within the laminar organics zone from Core 3 produced age dates of 660 ±30 years before present and 810 ±30 years before present (A.D.1350 and A.D.1200 respectively). These data likely represent minimum ages for abandonment of the youngest meander as Core 3 penetrated only 3.43 m to sandy sediments. The basal sand likely represents point bar or channel bar sands as it lacks the depth to be interpreted as the channel base for such a large river. Additional cores, sediment samples, and GPR data are needed to produce a more detailed interpretation of river behavior.

False Head Behavior and Mechanics of a Temperate Butterfly: Experiment and Modeling

Louis Volz

Faculty Sponsor: Dr. Julian Davis

Lycaenidae is a highly diverse family of butterfly. Lycaenids have a small, threadlike projection emanating from the posterior region of the hind wing. Lycaenid hind wings also have conspicuous converging markings and eye spots in the same region. This wing morphology is termed a "false head" because of its resemblance to the eyes and antennae of insects. The hypothesis regarding the functional significance of false heads is that they are anti-predator devices luring and deflecting the attention of predators toward a less critical portion of the butterfly (Cordero, 2001; Hill & Vaca, 2004; Robbins, 1980, 1981). Tails in the false head region of our target species show a highly "antennae-like" bouncing during feeding. This false head behavior suggests a relationship between mechanical properties or structures in the wing and the observed bouncing.

We seek to understand this relationship through observation of butterflies in the field and physical experiments to measure flexural stiffness along the length of the hind wing. This information will be used along with a finite element (FE) model of the hind wing to extract an average elastic modulus. This FE model will be constructed from photographs of the wing and geometric data collected from micro-CT scans. However, due to the small magnitudes of force and deflection that we are measuring, our test procedures must first be validated with specimens that have known material properties. I discuss the procedure that we developed for measuring flexural stiffness of butterfly wings. In addition, I present preliminary data regarding the calibration of our "Wing-Bar Gizmo." These data illustrate the accuracy we can expect during testing of butterfly wings.

In the future, FE simulation results will be correlated with flexural stiffness measurements to extract elastic modulus. We will also use high speed videos to compare vibration characteristics observed in the false head behavior to vibration simulations from the FE model to isolate the relationship between mechanics and behavior.

Exploring Large-Scale Shear Fold Geometry Using Three-Dimensional Google Earth Modeling

James Wallace

Faculty Sponsor: Dr. Joseph DiPietro

The Kotah dome forms a part of the Indian plate in Swat, Pakistan, directly south of the Indus suture zone and Kohistan arc complex. The rocks were metamorphosed to amphibolite facies and deformed in the Late Cretaceous-Eocene during Himalayan orogeny. Within the dome, the Middle Permian Swat granitic gneiss is unconformably overlain by Late Permian Marghazar formation that, in turn, is overlain by the Triassic Kashala formation. The Marghazar consists of rift-related quartzo-feldspathic schist and amphibolite that was deposited in extensional basins adjacent to up-thrown blocks of Swat gneiss. These normal faults have influenced subsequent deformation. The goal of this study was to accurately interpret the structural geometry of the Kotah dome by constructing four intersecting cross sections and combining them into a digital fence diagram using the program Cross Section Model Generator (S. Whitmeyer). The fence diagram can be rotated and adjusted for height and look direction to reveal the three-dimensional geometry. The results indicate a southwest-vergent recumbent fold with sheath-fold geometry that extends about 8 km across the dome.

Two observations that when taken together suggest that the fold was formed by distributed shear across a Late Permian normal fault that originally separated an up thrown block of Swat gneiss from a filled basin composed of Marghazar formation. The first observation is that the fold does not involve the Kashala formation. Secondly, the Marghazar formation is very thin above the folded layer of Swat gneiss and much thicker below. The deformation took place during prograde metamorphism and is believed to have occurred when the Indian plate was subducted beneath the Indus Mélange suture zone. Based on the vergence of the fold, we suggest that the transport direction of the Indus Mélange zone was toward the southwest.

The Effects of Racial Interactions on Self-Worth

Monika Wathen

Faculty Sponsor: Dr. Manuel Apodaca-Valdez

The purpose of this study was to see whether or not negative racial interactions can lead to self-oppression. As children, we are told, "Sticks and stones may break your bones, but words can never hurt you." As a child, we hold this saying as virtue; but as an adult, does that same philosophy work? How would people feel about themselves after constantly being told that they are incapable of succeeding because of their race? Not only did my research magnify the topic of racial interaction and prejudice, but also highlighted the problems and injustice facing Dominicans of darker pigmentation.

I conducted this study by first using several pictures of people of four different races, (Caucasian, African-American, Mexican, and Ecuadorian). Each race featured both a male and a female. The participant then had to read each scenario and decide which person fit the given scenario.(e.g. "This person created a multimillion dollar company" and "This person was the founder of a group of assassins.") The purpose of this portion of the research was to see which race the participant would choose for the good scenarios and which one they would choose for the negative scenarios.

After completing this part of the research, the participants were then given a self-analysis questionnaire where they had to answer questions about their education status, social groups, family values, favorite color, age, and economic status. The purpose for the self-analysis questionnaire was to determine if certain social influences (i.e. family values, and education status) would influence any of their answers. I asked the participants what their favorite color was to see if there was any similarity between the race with which they identified themselves and their favorite color. To my surprise, there was a shocking similarity.

This research served as a breaking point to not only psychology majors but also to all students of political, social, liberal and philosophical studies as well to see how difficult it is to survive in an environment where the only thing holding them back is their race.

Determining the Actin Gene Sequence for the Slime Mold Stemonitis flavogenita

Brett Williams

Faculty Sponsor: Dr. Jeannie T.B. Collins

In this research, the slime mold Stemonitis flavogenita was studied in order to determine the actin gene sequence. Actin is a cytoskeletal protein that is highly conserved among eukaryotes; however, the actin sequence for this species is currently not known. Using the Clustal X program, the actin sequences of other organisms were aligned in order to design primers that would be used in reverse transcription and PCR. DNA and RNA were extracted from the aphanoplasmodial and coralloid stages of S. flavogenita, and dot quantitation was used to determine the relative concentration of the extracted nucleic acid in the samples. The designed primers were then used in reverse transcription to synthesize cDNA from the RNA template strand. This cDNA, along with extracted DNA, was then used in PCR to amplify the actin sequence. The amplified actin sequence was analyzed through gel electrophoresis. It was determined that the actin bands on the gel were significantly smaller than the size which they were predicted to be. As a result of this, the parameters of the current PCR method are being modified to increase the amount of the actin sequence that is amplified. Results of these changes will be presented.

Racial Conflict Among Immigrant Haitians and Dominicans Within the Dominican Republic

Peter Williams

Faculty Sponsor: Dr. Manuel Apodaca-Valdez

This research explored the aftermath of the 2010 earthquake in Haiti and how the subsequent increased migration from Haiti to the Dominican Republic has enhanced or attenuated the cultural schism between the two historically opposed nations. The objective for this research was to determine if the conditions that Haitians face within the Dominican have improved or worsened since the earthquake. Primary research was conducted from February through June, 2011. I administered oral interviews with open ended and probing questions with both Haitians and Dominicans in the 'El Cibao' region of the Dominican Republic. The interviews were conducted in Spanish and then transcribed into English for further exploration. Previous research detailed how Haitians living in the Dominican Republic have been subject to racism and maltreatment in social, economic, and political arenas (Howard, 1). Even so, Dominican ambassador Anibal de Castro in the New York Times was quick to note that the Dominican Republic was the first country to give aid and has given the most aid as a percentage of GDP to Haiti since the earthquake in 2010. It should also be noted that in 2010, both President Fernandez of the Dominican and President Preval of Haiti met and agreed to formally cooperate in economic areas that affect both countries such as tourism and agriculture. My findings document this duality in that Haitians are subject to poor living conditions and are treated as inferior people. Dominicans are concerned with the ever increasing rate of immigration among fears that immigrant Haitians are stealing jobs and originating more poverty and crime. Therefore, although the governments of both countries seem committed to better relations in the future, a step in the right direction, the cultural schism is ever present and alive in the lives of Haitians inside the Dominican.

Centrosome Abnormalities in NIH3T3 Cells Treated with Mustard Gas Analog, 2-Chloroethylethyl Sulfide (2-CEES)

Ashtyn Zinn

Faculty Sponsor: Dr. Richard Bennett

Mustard gas (sulfur mustard) has been used as a chemical weapon since World War I and as recently as the first Gulf War. Along with phosgene, chlorine, and lewisite gases, mustard gas belongs to a class of chemicals known as vesicants due to their ability to cause the formation of painful blisters on exposed areas. Mustard gas is also an alkylating agent and has been indicated in lung cancer mainly in people exposed to chronic, low levels of mustard gas such as those employed by organizations that manufacture it. The mechanism of carcinogenesis by mustard gas is unknown, but several genes have been indicated to play a role in its progression including genes whose expression is driven by the tumor suppressor p53. Centrosomes are subcellular structures whose duplication is also regulated by p53. Cells with more than two centrosomes can become chromosomally unstable, which is thought to be a driving force in tumorigenesis. In this work, we investigated the role mustard gas has on centrosome number in cells lacking p53 as a way to explain the observed carcinogenicity. To this end, we exposed NIH3T3 cells (p53-/-) to the mustard gas analog 2-chloroethyl ethyl sulfide (2-CEES) for 24 hours and then identified the number of centrosomes per cell. We found that mustard gas decreased the number of cells with two centrosomes per cell and increased both cells with one and more than two centrosomes per cell. These data indicate that mustard gas may induce carcinogenesis by disrupting centrosome number in cells already lacking p53.

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