2008

2008 Program

University of Missouri-St. Louis

research · scholarship · creative works

2008 Undergraduate Research Symposium

Golden Key International Honour Society
UNIVERSITY OF MISSOURI - ST. LOUIS

Mission Statement

The members of the University of Missouri–St. Louis chapter of Golden Key International Honour Society (Golden Key) are committed to the creation of educational opportunities and the development of leadership skills. As leaders, we are dedicated to formulating a paradigm for student activism that preserves and advances the interests and reputation of our campus and its faculty.

Through the Undergraduate Research Symposium (URS), we are committed to the continued development of a venue for undergraduate students to present their research, scholarship, and creative works as they would in a professional-style conference. This multidisciplinary event is intended to help students achieve their educational and professional goals. These emerging scholars are provided with an environment that inspires confidence, refines communication skills, and demonstrates UM–St. Louis' commitment to cultivate a research culture within our undergraduate population. The URS provides an opportunity for the faculty and broader academic community to express support for the undergraduate scholars in furthering their research and graduate studies.

Poster Awards

The UM-St. Louis chapter of Sigma Xi, The Scientific Research Society, is offering a generous award opportunity to all poster presenters. Faculty judges will assess the posters on content and style, the abstracts on content and succinctness, and the presenters on their interaction with the audience.

A $100 award will be given in three categories:

- Natural Sciences
- Physical Sciences and Mathematics
- Social Sciences, Humanities, and the Arts

The URS ends at 3:00 pm. Shortly thereafter, the awards will be presented at a ceremony in the Millennium Student Center, Century Room C, third floor. Everyone is welcome to attend.

Companions in Zealous Research
Spoudon xynones

Acknowledgements

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Thank you!

The URS could not have happened without your support.
We look forward to working with you again next year.

From the Committee

Administrators, faculty, staff, students, and guests, we welcome you to the Seventh Annual Undergraduate Research Symposium. We are pleased that you have chosen to spend the afternoon with us. Thank you for supporting the University of Missouri's research mission by encouraging undergraduate research. We hope that you enjoy this year's symposium, brought to you by the UM–St. Louis chapter of Golden Key International Honour Society.

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Stacy Beckenholdt -- Anthropology
Catherine Koziol, MA, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

See Jane Hit: Aggression in Girls' Soccer

Oral Presentation

The purpose of this research was to explore contributing social factors to aggression in girls' soccer. Prior research has confirmed that aggression in female soccer increases from first halves of games to second halves. My research agrees but also looks into possible reasons for aggression. During observations of 8 high school–level recreational games, I tallied specific illegal acts of aggression committed by each team during each half of a game. Consistent with prior research, the number of acts was higher during the second halves, but further analysis shows that 71 percent of the time this was due to increased aggression by teams holding the losing positions at the end of the first half. The number of aggressive acts was also compared with the number of fouls called in response to these acts, the results of which strongly reflect potential biases of referees toward the losing teams. Additionally, interviews were conducted with 4 coaches, 4 referees, and 7 players. Also, 9 players filled out a survey questionnaire. Analysis of these revealed that today's young females are driven to win on soccer fields. My research found that this desire is heavily influenced by a player's interaction with parents, coaches, referees, teammates, and opposing team members. The desire to win expressed on the field by young female players may be more than an internal drive for success. It may also be a mechanism for positive reinforcement derived from the soccer player's family, mentors, and peers.

Karolyne Cronin -- Anthropology

Michael Ohnersorgen, PhD, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

Mississippian Feasting Pits

Oral Presentation

Cahokia was a mound-building culture during the Mississippian period. Archaeologists surmise that satellite communities were associated with the central city, but little is known about the rituals carried out in the associated communities. With the archaeological discovery that sub-Mound 51 at Cahokia was a seasonal feasting pit, much has been added to the knowledge of rituals. Specifically, we know more about what Cahokian feasting pits contained and when rituals might have taken place in the cycle of the seasons. My research uses sub-Mound 51 as a basic blueprint and analyzes the contents of pits at 4 other archaeological sites to see whether ritual feasting may have occurred at other Mississippian settlements or if feasting was limited to Cahokia. These sites (the BBB Motor Site, the Julien Site, the Turner and DeMange Site, and the Lohmann Site) were chosen because they were occupied around the same time period that sub-Mound 51 was in use. They were also selected because they were well-populated satellite communities. First, criteria for the difference between a common trash pit and a ritual feasting pit were established. Then, with this information the pits in the 4 sites were examined for similarities to sub-Mound 51. Results showed that they were not substantially similar. Also, I could not identify the season that these pits were in use to see if they correlated to the late summer–early autumn timeline evident at sub-Mound 51. The evidence shows that the ritual feasting was most likely held only at Cahokia.

Ellen Herget -- Anthropology
Allon Uhlmann, PhD, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

Meditating by the Christmas Tree: Midwestern Zen Buddhism

Oral Presentation

The process of syncretism refers to the changes in a religion as it combines with the existing beliefs in a foreign culture. Buddhism has made many changes in its 2,500-year history as it was adapted by adherents in different Asian cultures. The relatively new popularity of Buddhism in the United States is an ongoing example of syncretism. A Zen meditation center was selected in St. Louis, Missouri, for my research into American-style adaptations of traditional Zen Buddhism. Zen practitioners were observed two to three times a week over a period of four months during meditation and discussion sessions. Personal interviews with five members and with the center's founder were conducted. Also, an email survey was sent to the center's message list in order to contact 79 members. The interviews revealed the varying character of Midwestern Zen practitioners. The email survey established that practitioners were college educated and approximately 50 years of age. Backgrounds of the center's members varied (some practiced different religions and some were vegetarian). Many changes to traditional Zen Buddhism have been made to accommodate the members. Recent examples are (1) email votes to change protocol for convenience, (2) various activities involving the community, and (3) frequent email discussions on ethical issues related to Buddhism. Examining syncretism in modern America demonstrates the continuing adaptability of Buddhism to a wide variety of cultures.

Matthew Hull -- Anthropology

Donna Hart, PhD, Mentor
Michael Cosmopoulos, PhD, 2nd Mentor
Anthropology

Culture Clash at Thermopylae

Poster Presentation

Battlefield archaeology is a type of research that is an emerging field and has never been applied to the battlefield at Thermopylae. The Battle of Thermopylae (480 BCE), where Greeks defended southern Greece against a Persian invasion, was one of several well-known conflicts throughout history in which East fought West. My research aimed at determining through cultural analysis and historical investigation the factors that affected the outcome of this significant battle. After studying the topography and important locations of the battleground, I analyzed classical literature that referenced the battle and carried out research on historic Persian and Greek culture. There is little information on the combatants at Thermopylae, but my research determined the probable military tactics, weaponry, and equipment used. More importantly, my research tried to fill in the gaps concerning the religion and social structure of the combatants. Research showed that the Greeks' most important factor was their hoplite (wealthy citizen militia) system, while the Persians' most important factor was their highly advanced political bureaucracy. The cultures of the opposing forces at Thermopylae determined the sizes of the armies present and the tactics used. The outcome of the battle, therefore, was deeply rooted in the Greek and Persian cultures; ultimately, it was the cultural backgrounds of the fighters that most influenced the pyrrhic victory.

Jamie Kuechler -- Anthropology
Donna Hart, PhD, Mentor
Margo-Lea Hurwicz, PhD, 2nd Mentor
Anthropology

*Fan*demonium: An Analysis of St. Louis' Greatest Obsession

Poster Presentation

Previous research on sports and spectators shows that an important component of the baseball experience is crowd behavior. The reactions spectators have to one another are a major factor contributing to the excitement and arousal that result from sports spectatorship. Studies on crowd behavior and fan reaction show the factors that make in-person sports spectatorship distinctly different from the experience of televised sports viewing. However, they also show that fans perform the same behaviors at stadiums and in other public settings, such as bars or restaurants, provided they are watching a sports game. This study examines the attitudes and behaviors of baseball fans in the St. Louis area. It uses interviews and questionnaires to better understand the behavioral patterns of fans at a stadium, bar, and at home while watching a baseball game. In order to collect data for this study, participant observation took place at Busch Stadium and a bar. The behaviors that were observed to be appropriate in both settings were nearly identical. An analysis of the surveys also shows this to be true. It is hypothesized that a bar or restaurant is used as a substitute for the stadium, thus allowing fans to act out in the same way in each setting. However, the behaviors that are found to be appropriate in each location differ from the behaviors of everyday life, suggesting that participating in the baseball experience gives fans an opportunity to act in extreme ways. This analysis contributes to our understanding of fans and their emotional release at sports games.

Erika McClure -- Anthropology
Allon Uhlmann, PhD, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

Cooking Up Home: Food of the Bosnian Diaspora in St. Louis, Missouri

Oral Presentation

Food is a vital part of life and culture, and this cultural importance is highlighted in an increasingly globalized world. Bosnian refugees fled their home country in the mid 1990s and were placed in the St. Louis area. Although they left much behind, including family, homes, and professions, they brought their food traditions with them. My research is based on an ethnographic study of the foodways of the Bosnian and Bosnian-American community in and around St. Louis. Participant observation as a customer in restaurants, coffee shops, food markets, and other south St. Louis venues was carried out for four months. In addition, interviews were conducted with five members of the Bosnian community. My research found that the neighborhoods in which Bosnians live have been physically reshaped in order to meet their food-related needs. It also revealed how changing perceptions of gender and family roles have transformed how these people approach food in their own homes and how they utilize and perceive restaurants and convenience foods. Bosnian food traditions are continuously developing and changing in the face of the new locale. Foodways provide an interesting perspective on how the Bosnian identity is negotiated, reproduced, and transformed in the United States.

Daniel Pierce -- Anthropology
Michael Ohnersorgen, PhD, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

Ceramic Concentrations At Chacalilla, Nayarit, Mexico

Oral Presentation

One aspect of archaeological research is the ordering of people and their goods within a civilization. Using spatial analysis tools, my project looks at the concept of segregating different decorative styles of ceramics into specific areas at the site of an ancient city called Chacalilla, which is located in the present day state of Nayarit, Mexico. Using data collected in earlier field seasons, I used ArcMap 9.2 software to locate collection units of abnormally high concentrations of certain decorative styles of the ceramics used in Post-Classical Chacalilla. A database consisting of ware types and decorative elements (including color, temper, and design) was used and joined to layers within the maps, which were created to pinpoint locations of unusual ceramic abundance. Other databases on collection unit size, density, and mound data were joined with the maps and ceramic types to indicate the telltale signs of decorative segregation. Basic descriptive statistical comparisons by percentages were made among the individual units as well as between each unit and the site as a whole. This analysis showed little difference between the individual units and their variance from the average of the site as a whole. The spatial-analysis results, however, affirmed that decorative segregation did occur. Four units were anomalous based on the criteria of pottery types and locations in respect to the Chacalilla ceremonial complex. The segregations of decorative types may indicate locations of households involved in production of certain pottery types, households that had regular trade partners, or households involved in certain activities that used particular ceramics.

Mercedes Risner -- Anthropology

Pamela Ashmore, PhD, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

Native American Remains and Artifacts: Policies, Guidelines, and Ethical Standards

Oral Presentation

The care of Native American skeletal remains and funerary objects is covered by a multitude of policies, guidelines, and ethical standards that direct research and archival work in museums, universities, and repositories. I hypothesized that a correlation would exist between the percentage of a state's population that was Native American (including Native Alaskans, Native Hawaiians, or Pacific Islanders) and the quality of rules promulgated by facilities that house Native American remains and artifacts. I selected 15 states to investigate (7 with large and 8 with small indigenous populations). I then chose a museum, university, or other facility in each state to use as a prototype for how information on policies, guidelines, and ethical standards are disseminated. A content analysis of each facility's website was conducted based on 15 variables encompassing important features, such as Native American Graves Protection and Repatriation Act information. A regression analysis found a degree of correlation (r-square = 0.441799) between the level of the indigenous population and the quantity and quality of information available. For example, Alaska, Arizona, and California have high numbers of resident Native Americans whose representative facilities provided copious information, while Rhode Island and Vermont (which have few Native Americans) have facilities that provided little information. A large indigenous population, therefore, may influence the level of sensitivity to Native American concerns in institutions that study their culture, biology, and history

Camme Saulters -- Anthropology
Allon Uhlmann, PhD, Mentor
Donna, PhD, 2nd Mentor
Michael Ohnersorgen, PhD, 3rd Mentor
Anthropology

Of Earth and Clay: Unraveling Hispanic Origin Myths

Oral Presentation

The purpose of my research was to identify and describe variations that may occur within a Hispanic origin myth using a series of assessment factors: (1) the cultural origin of the myth (whether Aztec or Mayan), (2) how the myth is relayed (whether orally or written), and (3) the speaker's or writer's country of origin. I also examined the way myths become less important and diminished when native speakers immigrate to the United States. Two origin myths were used in this study, the creation of man and the myth of Popocatepetl. Data were collected from two families, one from Mexico and the other from Guatemala. Research methods included formal and informal interviews, as well as participant observation in the informants' homes when myths were being told. Analysis indicated that variations within the key characteristics of the myths can be attributed to all three factors investigated. In addition, the purpose for telling myths changed from explanations of the world's origin to less weighty purposes such as those found in ethnic folk tales.

Tamara Schutter -- Anthropology
Michael Ohnersorgen, PhD, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

Crimson Gold: Economics of Cochineal Production in Postclassical Mexico

Oral Presentation

The purpose of this research is to identify the economic implications involved in the production of the pigment obtained from the cochineal insect (*Dactylopius coccus*) in Postclassical Mexico (CE 900-1521). In order to establish labor-cost data on cochineal dye production, two protocols were used. First, data were collected through a series of experiments to find out the number of cochineal pigments and the amount of time required to produce the quality of red-dyed cotton fabric similar to the fabric produced by the Aztecs. The data provided by my experiments showed that it was labor intensive to find the exact amount of ingredients needed to produce the dyed fabric. The second protocol involved data collection from archaeological and art history literature regarding modern requirements for the propagation of the insect's host plant: the seeding of the cochineal on the host plant, the harvest of the cochineal insect, and the time required to produce the cochineal pigment. With the combined data, a modern cost of $5.74 was the estimated amount of money required to make one pound of cochineal dyed fabric (approximately two square yards). It can be concluded that even with today's technology, there is a significant amount of money and labor required in the manufacturing of cochineal dyed-fabric production. Therefore, considering the preindustrial technology of the Postclassical Aztecs, it can be assumed that even more labor and capital may have been involved in cochineal dyed–fabric production used as tribute and elite goods.

Adam Shifrin -- Anthropology
Allon Uhlmann, PhD, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

Ancient Methodologies: Martial Arts Pedagogy in Collegiate Karate Club

Oral Presentation

Change in the practice of martial arts as a result of exportation from the Far East to the United States was inevitable. As karate was brought to the U.S. the approach to training was often slavishly copied from Japanese instructors, without understanding the true concepts behind karate and without understanding how karate should be adapted to confront modern combative scenarios. Martial arts training has undergone many changes over the years, and my research provides examples of the ongoing adaptation of the ancient methodologies. The Washington University Traditional Karate Club, a member of the Traditional Karate Research Institute, is a collegiate karate training group in St. Louis, Missouri. This club was selected in order to study how training changed as it adapted to modern conflict while adhering to ancient methodologies. I conducted participant observation two to three times a week over a period of six months. This included both observation of training and practice and conversation with the club's students and instructors. Also, five interviews with instructors and students were conducted in person and by e-mail. From a list of 15 attributes, I found that this club has managed to successfully blend the attributes most associated with modern pedagogical approaches with the attributes most associated with traditional approaches. The Washington University Traditional Karate Club's unique approach to training has enabled it to maintain its rich tradition of ancient martial strategy while applying it to modern real-life situations. This amalgamation of old and new is evidence of a new holistic approach to martial arts training that is becoming increasingly common among instructors today.

Angela Toole -- Anthropology
Donna Hart, PhD, Mentor
Anthropology

Media Influence on Changing Perceptions of Masculine Behavior

Poster Presentation

Since the 1970s, the American concept of femininity has adapted to encompass behaviors not traditionally perceived as female. As well, our cultural concepts of masculinity may have changed. I hypothesized that contemporary media have provided a platform that may reflect a change in the dominant American male gender role. Using a survey questionnaire, data were gathered on concepts of masculinity and media influence from 113 undergraduates enrolled at the University of Missouri–St. Louis. I questioned (1) whether concepts of masculinity have changed over the past 30 years to include increased emotional expression and decreased emphasis on physical strength and (2) how media portrays and informs these changes. Eighty-six percent of both male and female respondents recognized a change in American masculinity and agreed with my definition of modern masculinity (i.e., emotionally open, responsive listener, comfortable with strong women). Sixty-eight percent of male respondents identified themselves as modernly masculine. Traditional feminine characteristics were identified as both masculine and feminine by 61.5 percent of male and female respondents. However, data showed little association between changing perceptions of masculinity and performers who reflect the ideal of modern masculinity through their appearance, professional roles, and personalities. Both male and female respondents consistently favored traditional masculine personas in their selection of performers, indicating a reverence for old models of accepted male behavior inconsistent with their approval of nontraditional behaviors for men elsewhere in the survey. Studies have shown that media continue to depict violence as a key component of masculinity, perhaps contributing to the perpetuation of outdated gender constructions.

Michelle Webb -- Anthropology
Pamela Ashmore, PhD, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

Arthritic Development in a Nineteenth-Century Population

Oral Presentation

Arthritis is the largest cause of disability in older populations in western countries, and osteoarthritis is the primary culprit in the United Kingdom, the United States, Australia, and Canada. Occupation and gender play a major role in the development of knee, elbow, and shoulder arthritis. My research focuses on how occupation-based osteoarthritis became manifest in the skeletal remains of men and women from the Midwestern United States in the nineteenth century. Visual observations of the knee, elbow, and shoulder joints of 68 adults over the age of 20 from three rural and two urban populations were performed to ascertain the degree and type of arthritic development in these individuals by age and sex. The study population was divided by sex (44 males, 24 females) to see if women and men developed arthritis at different rates based on gendered occupations of the period. Males showed a greater frequency of arthritic development in the knees and elbows at a younger age than females. This suggests that working class males who performed heavy labor developed occupation-based arthritis. This finding is consistent with contemporary studies. Females exhibited more localized arthritic development in the elbows and shoulders, which is consistent with the type of work done in the home by women of the period. Females over the age of 50, however, showed more arthritic development than males who were over the age of 50. This finding is also consistent with contemporary studies. My research indicates that there were differences in arthritic development in the nineteenth century between males and females based on occupation and gender.

Kimberly Wilbanks -- Anthropology & Psychology

Donna Hart, PhD, Mentor
Catherine Koziol, MA, 2nd Mentor
Anthropology

Differences in Tool Use Between Males and Females in Prehistoric Populations

Poster Presentation

Some anthropologists contend that females are more likely to use energy-conserving tools for food gathering and processing because they have more energetically demanding reproductive responsibilities, for example, pregnancy, nursing, and taking care of offspring. To test this assertion, grave goods found in adult male and female burials from five archaeological sites in North and Central America (ranging from 100 BCE to 1450 CE) were examined. A hypothesis was tested that females were more likely to be buried with tools for cooking, processing and storing foods, and weaving (all considered gathering tools). Statistical tests were used to assess the findings; there was a significant difference between the frequency of gathering tools buried with women and those buried with men. Evolutionary implications and evidence from nonhuman primates and foraging cultures were contrasted with agricultural societies to access these results. The relative status of women changed dramatically when human populations shifted from foraging to agriculture, but my study shows that even in nonegalitarian agricultural societies, women were still associated with many tools intended for use in food gathering and processing and for use in weaving. This type of study helps to illuminate the importance of female roles in prehistoric populations.

Kimberly Wilbanks -- Anthropology & Psychology
Donna Hart, PhD, Mentor
Anthropology

Sex Differences in Chimpanzee Feeding Patterns and Activity

Poster Presentation

In the wild, male chimpanzees spend more time traveling and socializing and less time feeding than females. For females these differences may exist to compensate for the more energetic demands of pregnancy and lactation, and females may socialize less and forage away from other adults in order to conserve energy by decreasing competition for food. In a study at the St. Louis Zoo, I gathered data on the activity budgets (resting, feeding, locomoting, and socializing) of seven adult chimpanzees (females = 4, males = 3). Data were collected using one-minute focal-animal sampling observations over 23 bours. A hypothesis was tested that within this group of captive chimpanzees, unlike within typical wild chimpanzee groups, there would be no differences between the locomoting, feeding, and socializing patterns of males and females because there were no pregnant or lactating females. As predicted, no difference was found between the percentage of time males spent feeding and locomoting compared to the amount of time females spent feeding and locomoting. However, a Chi-square statistical analysis found that males did spend a significantly longer amount of time socializing than females ($X2 = 9.59$, $p>.05$). The results support my hypothesis that, while nonreproducing captive females and males do not differ in the amount of time they spend feeding and locomoting, they do differ in the amount of time they spend socializing, which suggests that there may be reasons why females socialize less that do not directly relate to the energy requirements of pregnancy, lactation, and the rearing of offspring.

Kimberly Wilbanks -- Anthropology & Psychology

Donna Hart, PhD, Mentor
Anthropology

Sex Differences in Feeding Ecology Among Mantled Howler Monkeys

Poster Presentation

Although sex differences in feeding ecology have been observed in several species of monkeys and apes, very few studies of sex differences in diet have been conducted on mantled howler monkeys (*Alouatta palliata*). Based on studies of other primate species, female howler monkeys may spend more of their time feeding and may also differ from males in the variety of foods they consume. It has been asserted that differences in feeding exist to compensate for the females' energetic demands during pregnancy and lactation. In a study at La Suerte Biological Research Station in Costa Rica, I gathered data on mantled howler activity budgets (resting, feeding, foraging, traveling, and socializing) as well as canopy location and plants exploited by the monkeys. Data were collected using one-minute focal-animal sampling of adult males and adult females over 24.07 hours. Females spent approximately 31 percent of their total time feeding, whereas males spent 20.5 percent. A Chi-square statistical analysis found that females did spend a significantly longer amount of time feeding than males ($X2 = 13.17$, $p>.01$). Females also fed from a wider variety of plant species, including four plant families and two unidentified species, whereas males fed from only three plant families. The results support my hypothesis that females would spend more time feeding and would exploit a wider variety of plants. These results reinforce studies that have found similar sex differences in the feeding ecology of various primate species and suggest that similar differences exist between male and female mantled howler monkeys.

Jesse Williams -- Anthropology
Michael Ohnersorgen, PhD, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

Trash Talks: A Garbology Analysis of an Illinois Neighborhood

Oral Presentation

Throwaway consumerism has become the norm in modern-day western society, as people buy and dispose of goods on a regular basis. My research analyzes the trash generated by typical American households as a way to assess the consumption of fast foods, junk foods, healthy foods, alcohol, and tobacco. I based my study on William Rathje's 1971 Garbage Project, in which he interviewed households about their weekly consumption habits. By examining the garbage of his study population, he found discrepancies between what people reported they consumed and the actual evidence found in trash. I followed the tradition of the Rathje's Garbage Project by selecting 38 households in an Illinois neighborhood as my study population. I distributed questionnaires concerning weekly fast food, junk food, alcohol, and tobacco consumption, and the overall healthy nature of their diets. I then examined the garbage of these households. Results showed that the reported information was different from the actual content of their trash. Seventy-four percent of households reported healthy diets; however, garbage revealed 42 percent more fast food and 54 percent more junk food than healthy food. The amount of alcohol apparently consumed was 39 percent more than reported, and the amount of tobacco was 21 percent more than reported. By studying garbage, researchers open windows into the daily lives and consumption habits of people.

Robert Winningham -- Anthropology

Sheliah Clarke-Ekong, PhD, Mentor
Donna Hart, PhD, 2nd Mentor
Anthropology

Eastern and Western Perceptions of Humans and Nature

Oral Presentation

Across cultures human beings acknowledge the importance of individual and communal identity markers that are socially constructed. How these markers impact our interrelationships with one another and our affinity for other living organisms may have significant impact on how humans perceive themselves in relation to the natural world. A cross-cultural approach is used here to elicit the perceptions of the human species in relation to other animal species as held by United States citizens representing a Western view and Japanese students representing an Eastern view in comparison with published literature on the national cultural trait studies of these populations. The database contains information derived from sixty-three questionnaires (American respondents, n =36; Japanese respondents, n =27) asking each respondent twenty-five questions directed at how they see themselves and the human species, as part of nature or as distant from nature. Frequency distributions for comparison of variables and summaries based on percentages were calculated to assess the magnitude of the identity markers by different behavioral categories in the two populations. Analysis indicated that three traits (instincts, loyalty, and the intense caring of young) were considered to be shared traits found in both humans and nonhumans. However, other traits (ability to create art and music, morality, and spirituality) were associated primarily with humans. My results were compatible with much of the published literature on this topic.

Biology

Kirk Barnett
Eric Bretsnyder
Brandi Lunsford
Eugenia Miller
Courtney Pike
Puja Sharma
Amanda Smith
Daniel Smith
Amanda Tawfall

Kirk Barnett -- Biology

Robert J. Marquis, PhD, Mentor
Biology

The Effect of *Lonicera Maackii* on Rodent Behavior in an Invaded Forest

Poster & Oral Presentation

Experiments demonstrate that during the process of foraging for seeds, rodents balance seed quantity and quality against the risk of predation. The density and architectural complexity of vegetation can lessen the likelihood that rodents will be taken by their own predators, such as owls and hawks. Often, invasive plant species alter vegetative cover, which modifies a rodent's sense of predation risk. Thus, invasive plants have the potential to change rodent behavior and, subsequently, seed predation levels. *Lonicera maackii* is an aggressive and highly invasive plant that is the predominant shrub in many U.S. forested areas; in some cases the invasion changes the natural patchy understory into a massive and very dense vegetation wall. This project tests the hypothesis that *L. maackii* will affect the activity of *Peromyscus leucopus* (the white-footed mouse) by providing it cover from predators. We manipulated *L. maackii* cover and, using the evidence of track plates, examined the effect on *P. leucopus* activity. We predict that *P. Leucopus* will be most active in *L. maackii* infested areas where fruit is available.

Eric Bretsnyder -- Biochemistry & Biotechnology
Philip D. Weyman, PhD, Mentor
Biology

Biodiesel Production from Genetically Modified *Anabaena Variabilis*

Poster Presentation

The cyanobacterium *Anabaena variabilis* is a filamentous, photosynthetic bacterium that can terminally differentiate into heterocyst cells. Heterocyst cells are responsible for the production of fixed nitrogen, which serves to fertilize neighboring photosynthesizing cells. Heterocyst cells prevent oxygen from entering photosynthesizing cells, in part, by creating a thick glycolipid coat on the cell surface. By inserting three genes into *Anabaena variabilis* under the control of the nitrogenase (nifH) promoter, transcription of the transgenes are localized in the heterocyst cells where a larger amount of lipids are transformed into esters, which, in turn, can be used as an alternative fuel source. Three genes were introduced into *Anabaena variabilis*: pdc, adhB, and atfA. The pdc gene is a pyruvate decarboxylase that is responsible for making acetaldehyde and for removing one CO2 molecule from one pyruvate molecule. The adhB gene is an alcohol dehydrogenase that is responsible for the reduction of acetaldehyde to ethanol. The atfA gene is a nonspecific acyltransferase that binds ethanol to fatty acids through an ester bond. When working in conjunction, these three genes form fatty acid ethyl esters, which can be used as biodiesel. Data showing the construction, phenotype, and transcription of pdc, adhB, and atfA will be presented.

Brandi Lunsford -- Biology
Godfrey R. Bourne, PhD, Mentor
Biology

Pollinators at the Edge

Poster Presentation

Rainforests, savannas, wet meadows, bogs, wetlands, and ocean beaches all depend on a diverse assemblage of pollinators. In the Neotropics, wild-pollinator populations living in intact landscapes contribute to the successful variety of crops: avocados, pineapples, cashews, tomatoes, bananas, pigeon peas, hot peppers, mangoes, and pumpkins. In Guyana, however, pollinator populations are declining. And in North America, Great Britain, and the Netherlands, they are at risk of extinction. The government of Guyana promotes inappropriate crop production in forests and savannas on the white sand formation. The government uses the slash-and-burn method of clearing forests, which leaves only a few economically important trees (like the kuria palm, *Astrocaryum tucuma*, which is prized for its fruit) standing. As a result, many forest pollinators exploit the nectar and pollen resources of weedy plant species that grow at the edge of the cleared forests. Declines in pollination services are raising concerns worldwide, yet little is known about these patterns of decline, which are taking place in the areas where pollinators assemble. Census reports taken from ant, bee, fly, butterfly, bat, and hummingbird assemblages between 2004 and 2007 at CEIBA Biological Center in Guyana suggests that bee, butterfly, and hummingbird diversity is declining.

Eugenia Miller -- Biology
Godfrey R. Bourne, PhD, Mentor
Biology

Livebearing Fish: The Answer to Psychological Questions

Poster Presentation

The livebearing fish *Poecilia reticulata, parae, vivipara*, and *picta* provide opportunities for studying fish sexual selection and personality development because of their color patterns, the accessibility of their natural habitat, and the ease with which they are bred in the laboratory. The coloration, behavior, and personality of individuals and their general system of mating are perfect examples of the secondary sexual characteristics that are explained by Darwin's theory of sexual selection. In poeciliids, color patterns are genetically based and highly polymorphic, which allows a researcher to easily recognize individuals and assign parentage. This study investigates the processes of poeciliid sexual selection within a single population. In addition, it compares and replicates evolutionary dynamics occurring in multiple populations. Laboratory experiments indicate (1) a tendency in females to prefer males with carotenoid coloration, (2) specific types of maternal behavior, (3) the development of distinct personality in individuals, (4) that males exhibit behavioral syndromes, and (5) that there are costs and benefits of male boldness.

Courtney Pike -- Biology
Godfrey R. Bourne, PhD, Mentor
Biology

Anuran Zoogeography of the Kaieteur Falls Tepui, Guyana

Poster Presentation

The diversity of frogs and toads (Anura) in one location on the Guiana Shield, Kaieteur National Park (KNP) in Guyana, South America, was used to test several posited theories of origin of the anuran fauna and to assess which one best explained current frog distributions. KNP is situated on the eastern edge of the Potaro Plateau in west-central Guyana, South America. The distribution patterns of known families, genera, and species from KNP were examined using generalized distribution patterns. Eight families, 20 genera, and 50 species of anura sampled represent minimum estimates of taxa currently known for the original KNP. Families had distributions that varied from local to global. Families tended to have cosmopolitan or pantropical distributions; genera were mostly Neotropical. And the distribution of most species was either restricted to Guyana, the Guiana Shield, northern South America, or the Neotropical, each level inclusive of the previous. The anuran fauna of KNP had its strongest affinity with the Guiana Shield, and 86 percent of species had a distribution corresponding with the Shield or a distribution that was more restricted within the Shield. There was a distinct anuran fauna on the Guiana Shield, and its affinities nestled within the fauna of northern South America, and even beyond that the Neotropics. This fauna was not closely affiliated with the anuran faunas of the Brazilian Shield, the Amazon, the Andes, the Atlantic Forest of Brazil, southern South America, or southern Africa.

Puja Sharma -- Biology
Godfrey R. Bourne, PhD, Mentor
Biology

High Diversity of Reproductive Modes in Frogs of Kaieteur National Park

Poster Presentation

Although frogs lay fishlike eggs, they have colonized numerous terrestrial habitats. This evolutionary trend was possible because of a diversity of reproductive adaptations that ensure that eggs remain hydrated and that embryos remain nourished and protected. Thus, anurans have a greater diversity of reproductive modes than all tetrapods. Prior to this study, 39 reproductive modes were recognized. Here, I propose an additional mode. The complex interplay of topography of Kaieteur National Park (tall and stunted forests, bromeliad glades, sedge meadows, bare sandstone expanses, and mist from a gigantic falls that supplements an already high humidity and that reduces risks of desiccation) have facilitated the evolution of reproductive strategies with eggs and/or tadpoles that develop without water. Kaieteur National Park is relatively small and is under assault from clandestine mining; and because new species are being discovered and several are endemic to the locality, conservation and development of management policies that promote sustainability need to receive greater attention.

Amanda Smith -- Biochemistry & Biotechnology
Bethany Zolman, PhD, Mentor
Biology

Characterization of Oil Metabolism in *Arabidopsis*

Poster Presentation

Plants store energy in their seeds in the form of oils, proteins, or sugars. Plant metabolism studies reveal important information about energy utilization in plants. This research is done using the model organism *Arabidopsis thaliana,* which is a weed in the mustard family; however, this work may provide details regarding metabolic pathways conserved in a number of crops grown in Missouri, including canola, soybean, and sunflowers. My research focuses on the breakdown of fatty acids that are broken down to provide energy for growth. The first step in this process is catalyzed by acyl-CoA oxidase (ACX). *Arabidopsis* plants have six ACX genes which are similar and have overlapping functions. Each of these enzymes act on fatty acid targets, based on the length of the fatty acid chain. Six mutants have been generated that are each defective in one type of ACX enzyme. Despite the mutations, the plants are still able to metabolize fatty acids normally, indicating a redundancy in function among the six ACX proteins. To further examine the role of the ACX enzymes, we have generated double and triple mutants that are defective in two or three types of ACX enzymes. We are characterizing the *acx* mutants by studying how the plants grow under different conditions. With this knowledge, we can think about ways to maximize plant growth through more efficient metabolism.

Sorry for the Inconvenience
Presentation Cancelled
by Participant

Daniel Smith -- Biology
Godfrey R. Bourne, PhD, Mentor
Biology

Characterization of Oil Metabolism in *Arabidopsis*

Poster Presentation

Although CEIBA Biological Center (CEIBA) only covers 13 hectares of seasonal secondary and flooded primary forests, it appears to have high butterfly diversity, based on visual surveys conducted from 2004 to 2007. About a third of the species have been digitally photographed since 2005. The presence and absence of patterns of families, genera, and species known from CEIBA were compared with those of Costa Rica's much larger Santa Rosa National Park (SR) and the greater metropolitan St. Louis area (STL). CEIBA has a minimum of 12 families, 54 genera, and 80 species; SR has 11 families, 60 genera, and 104 species; while STL has 11, 82, and 134, respectively. Families had distributions that varied from local to global and tended to have new world distributions. Genera were mostly Neotropical. And most species were either restricted to Guyana, northern South America, or Neotropical in distribution, each level inclusive of the previous. The butterfly fauna of CEIBA at the species level had its strongest affinity with northern South America and Trinidad. There was no distinct butterfly fauna on the Guiana Shield, and its affinities nestled within the fauna of northern South American and beyond that into Central America and the eastern USA. This fauna is also closely affiliated with Amazonia but not with that of the western Andes, Atlantic forest habitats of Brazil, southern South America, or Africa.

Amanda Tawfall -- Biochemistry & Biotechnology
Xuemin (Sam) Wang, PhD, Mentor
Biology

The Search for Drought-Resistant Genes

Poster Presentation

Cell membranes are physical barriers that separate the cell interior from the environment, and they are also the site at which plants sense environmental stress, which causes them to transduce a physiological response such as drought damage or tolerance. My work is focused on a family of enzymes called phospholipase D, which break down membrane structural lipids into smaller fragments. Some of the genes that encode these enzymes have been implicated in how plants respond to water deficits. Using mutant versions of the genes that make up the phospholipases, I carried out experiments to determine if any of these genes work in drought response. I tested the mutant *Arabidopsis* plants that are defective in phospholipase genes. I looked to see if these genes normally contribute to specific responses such as drought. By exposing both mutant plants and wild-type plants to drought conditions, we compared the resulting growth to determine if any of our mutants are more resistant or sensitive to drought. An alteration in growth performance under drought conditions could mean that the gene is involved in plant-drought responses. With further research and development, plants could be designed with that gene engineered so that plants are able to grow normally in a drought season.

Chemistry and Biochemistry

Teresa Bandrowsky
Jozo Barac
James Carroll, II
Scott Hasty
Mercy Kiiru
Kara Kinzel
Matthew Lenze
Matheen Mohabbat
Adele Pacquette
Justin Paoli
Holly Pope
Holly Scheibel
Jillienne Touchette
Sean Whittemore

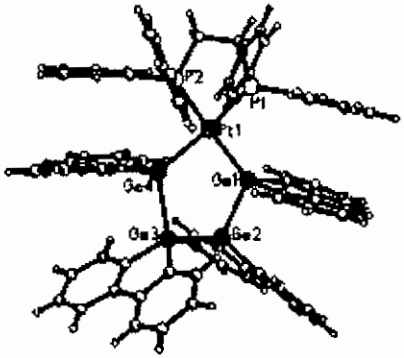
Teresa Bandrowsky -- Chemistry
Janet Braddock Wilking, PhD, Mentor
Chemistry & Biochemistry

Reactivity Of Germafluorene With The Phosphine-Platinum (II) Complex, Me2pt (Dppe)

Poster Presentation

The reactivity of secondary hydrogermanes (R_2GeH_2) toward late transition metals is of particular interest since it is anticipated that both Ge – H bonds can be activated to form a variety of oxidative addition products. The focus of this experiment was the activation of the Ge – H bonds of germafluorene (1, $H_2GeC_{12}H_8$) by the chelating Pt (II) phosphine complex, Me_2Pt(dppe) (2, dppe = 1,2-bis(diphenylphosphino)ethane). The reaction of germafluorene (1) with Me_2Pt(dppe) (2) at 50 °C in C_7D_8 yielded the cyclic mononuclear complex (dppe)$Pt(GeC_{12}H_8)_4$ (3) in % yield. Complex (3) was characterized by multinuclear NMR spectroscopy and X-ray crystallography. This unexpected product resulted from a formal dehydrocoupling reaction promoted by the Pt center. These results are quite different from the previous reactivity study of germafluorene, with a different precursor, $(Ph_3P)_2Pt(\eta^2\text{-}C_2H_4)$, where the major products were a digermane complex, $(Ph_3P)_2(H)Pt(GeC_{12}H_8)_2Pt(H)(PPh_3)_2$ and a triplatinum complex with bridging germafluorenyl groups, $[(Ph_3P)Ge(\mu\text{-}GeC_{12}H_8)]_3$. Future studies are planned to try and determine the mechanism for the formation of complex (3).

Figure 1. Molecular structure of (dppe) Pt $(GeC_{12}H_8)_4$ (3)



Jozo Barac -- Chemistry
Archana Parameswar, PhD student, Chemistry, Partner
Nishika Muddasani, Intern, John Burroughs H.S., 2nd Partner
Rensheng Luo, PhD, Mentor
Alexei V. Demchenko, PhD, 2nd Mentor
Chemistry & Biochemistry

NMR Structure and Conformation Studies of Capsular Serotypes 6C

Poster Presentation

Streptococcus pneumoniae remains a significant health threat worldwide, whose effects may lead to death, especially in the young and old. Currently available pneumococcal vaccines are designed to elicit antibodies to the capsular polysaccharides of the most common pneumococcal serotypes. Hence, the serological types of pneumonia have been extensively investigated. Capsular serotype 6C is a newly found serotype among pneumococcal isolates and is listed as the ninety-first discovered pneumococcal serotype. Its molecule structure is similar to serotype 6A, the only difference being the orientation of the hydroxyl group attached to the fourth carbon of galactose and glucose. This small structural difference explains why 6C was not originally identified with polyclonal antisera in the past. In order to biochemically distinguish sereotype 6C from 6A, we study the chemical structure and conformation of the synthesized repeating-unit of 6A and 6C by nuclear magnetic resonance (NMR). Two-dimensional ^{1}H-^{1}H COSY, ^{1}H-^{1}H TOCSY, ^{1}H-^{1}H NOESY, ^{1}H-^{13}C HMQC, and HMBC were used to identify their chemical structures. The conformational analyses were made by 2D DQFCOSY and 2D NOESY. Future studies will aim to define the three-dimensional structure of serotypes 6A and 6C in detail and their structural calculations; analyze the interactions of the serotypes with the protein bovine serum albumin, BSA; and clarify the dynamics in these systems.

James Carroll, II -- Chemistry
Janet Braddock Wilking, PhD, Mentor
Chemistry & Biochemistry

Synthesis and Reactivity of Select Group 14 Metalloles

Poster & Oral Presentation

The current study involves the preparation of 1,1-dihydrido-2,3,4,5-tetraphenylgermole (Compound **1**) with the chemical formula $H_2GeC_4Ph_4$ (Ph = C_6H_5). Compound **1** contains a definitive five-membered ring consisting of a germanium atom with four carbon atoms. The germanium center contains, in addition to the bonds with carbon, two Ge-H bonds. Compound **1** is synthesized by reaction of diphenylacetylene (C_8H_{10}) with lithium metal in ether and then by reacting with germanium tetrachloride ($GeCl_4$) to form the dichloro-analogue of Compound **1**, which is then reduced using $LiAlH_4$ to form Compound **1**. The goal of the project is to investigate the reactivity of Compound **1** with a number of platinum phosphine complexes (R'_2-Pt-$(P\text{-}R_3)_2$). It also compares the reactivity and structure of this product with similar reactions using a reactant similar to Compound **1**, where silicon replaces germanium in the five-membered ring. According to analysis by NMR spectroscopy, Compound **1** has been formed but has yet to be isolated. Once isolated, Compound **1** will then be reacted with platinum phosphine complexes.

Scott Hasty -- Chemistry

Archana Parameswar, PhD student, Chemistry, Partner
Alexei V. Demchenko, PhD, Mentor
Chemistry & Biochemistry

Structural Components of *Streptococcus pneumoniae* Serogroup 6

Poster Presentation

Complex carbohydrates are a unique family of multifunctional compounds that are involved in many biological phenomena. With the explosive growth of glycobiology in recent years, it has been found that these compounds play a pivotal role in various life-threatening processes. As these roles become more understood, interest has risen for the development of carbohydrate-based therapeutics and vaccines. Of huge interest to us, in particular, is the development of fully synthetic carbohydrate-protein conjugates based on the carbohydrate capsule surrounding *Streptococcus pneumoniae* (SPn) bacterial cells. This bacterium is one of the most frequent causes of bacterial infection in young children and the immunocompromised, accounting for nearly 20 percent of all childhood deaths under the age of five. Amongst 91 known classes of carbohydrates (serotypes) surrounding pneumococcal capsules, we are interested in carbohydrates of serotypes 6A and 6B. This poster details the construction of the building blocks used for the target synthesis of this serotype.

Mercy Kiiru -- Chemistry

Aileen Fay G. Bongat, Chemistry, Partner
Alexei V. Demchenko, PhD, Mentor
Chemistry & Biochemistry

Thioimidates of 2-Amino-Deoxy Sugars in the Synthesis of Structural Analogs of *Escherichia Coli* Lipid A

Poster Presentation

Lipid A is a glucosamine-based phospholipid that anchors carbohydrate molecules to the outer membrane of most Gram-negative bacteria. During severe infection, this amphiphilic macromolecule invokes a strong and acute pro-inflammatory response that leads to sepsis and ultimately to septic shock, organ failure, and death. Thus, following the convention that the best antidote is often a derivative of the parent agonistic molecule, researchers have been actively pursuing the idea of creating an analog of Lipid A that can block the cellular receptor for this molecule and thereby arrest the cascade of events that leads to sepsis. Consequently, we became interested in creating analogs of Lipid A, anticipating that this model structure may exhibit the desired effect without being harmful to the host cell. Moreover, since Lipid A shares a structural motif prevalent in biologically relevant carbohydrates—the presence of 1,2-*trans* linked residues of 2-amino-2-deoxysugars—we investigated the application of our novel thioimidoyl methodology to the synthesis of 1,2-trans glycosides of 2-amino-2-deoxysugars. Accordingly, we found that along with providing a flexible approach to the synthesis 2-amino-2-deoxyglucopyranosides, our method allows for the chemo-selective assembly of oligosaccharides containing multiple residues of 2-amino-2-deoxyglycoses. This presentation details the application of the aforementioned thioimidoyl methodology towards the selective activation approach to oligosaccharide assembly and the synthesis of the disaccharide core of Lipid A

Kara Kinzel -- Chemistry
Joyce Y. Corey, PhD, Mentor
Janet Braddock Wilking, PhD, 2nd Mentor
Chemistry & Biochemistry

Synthesis of Silanes and Interactions with a Platinum(0) Complex: A Reactivity Study

Poster & Oral Presentation

The study of how transition metals interact with Si-H bonds is important for the development of useful catalysts for industrial production of many silicone and polysilane compounds, as well as many industrial organic targets. While the use of silanes along with transition metal complexes is common in order to catalyze certain organic reactions, the mechanism that allows these reactions to take place is relatively unknown. The objective of my research is to synthesize various cyclic and acyclic silanes via organometallic and inorganic methods, and then use NMR spectroscopy to study the reactivity of these silanes with a platinum(0) complex. The information obtained from the reactions of these silanes with the Pt(0) complex provides a better understanding of the Si-transition metal interactions, offering insight into the basic mechanistic processes involved in the silicones industry. Such novel information could aid in the development of a better catalyst, which could enable otherwise difficult chemical reactions as well as lead to the development of a catalyst that promotes greener chemistry.

Adele Pacquette -- Chemistry
Keith Stine, PhD, Mentor
Chemistry & Biochemistry

Immobilization of Alkaline Phosphatase by Covalent Attachment to a Porous Gold Platform

Poster Presentation

Nanoporous gold (NPG) has been used as a biocompatible platform for the immobilization of the enzyme alkaline phosphatase (ALP). Immobilization of enzymes on solid supports is applicable to the development of biosensors. Covalent attachment modifies the NPG surface, thus limiting the amount of enzyme immobilized on the gold surface but enhancing the sensitivity to the detection of biomolecules. Controlling the amount of enzyme that binds to the surface is essential for enzyme use in biosensors. This investigation reports the activity of ALP immobilized on a NPG surface by using short chain carboxylic acid thiols, thioctic acid, and 11-mercapto-undecanoic acid, as direct linkers to bind ALP to the gold surface. The enzyme was attached to the thiols through amine coupling with the coupling agents EDC and NHS, which formed self-assembled monolayers of esters of the acids. The enzyme kinetics of ALP as a hydrolase, which dephosphorylated the substrate p-nitrophenyl phosphate (PNPP) to p-nitrophenolate (PNP), were studied using UV-Visible spectroscopy by monitoring PNP absorbance at 410 nm wavelength. Kinetic parameters, K_M and V_{MAX}, were used to compare the activity of covalently attached ALP to previous work using adsorbed ALP. Covalent attachment of ALP to the NPG surface results in enzyme kinetics that are more stable over time. In future studies, this method of immobilization will be applied to monitor the activity of ALP immobilized on the secondary antibody in enzyme-linked immunosorbent assays (ELISA) for cancer diagnosis.

Justin Paoli -- Physics
Jingyue (Jimmy) Liu, PhD, Mentor
Chemistry & Biochemistry, Physics

Growth of Novel ZnO Nanostructures

Poster Presentation

The ongoing need for energy has created a massive effort to develop better and more efficient methods of producing energy. Many sources of alternative energy have been explored. Nanoscale materials are of particular interest because of their unique properties. Nanostructured metal oxides such as ZnO can be used in low temperature fuel cells as well as to develop solar cells. Using the technique of solid vapor deposition, many novel nanostructures have been discovered. I used metal catalyst nanoparticles in a high temperature tube furnace to control the growth processes of ZnO nanostructures. I used a scanning electron microscope to examine the types of ZnO nanostructures that grew. Various types were observed, including pointed nanobelts and hexagonally-shaped nanohelices. In the future, I plan to grow treelike (or branched) ZnO nanostructures, which can be used to develop more efficient solar cells. My effort to develop novel nanostructured materials for solar cells and for low temperature fuel cells will benefit society in these fossil fuel–addicted times.

Holly Pope -- Biochemistry & Biotechnology
James K. Bashkin, DPhil, Mentor
Kevin Koeller, PhD, 2nd Mentor
Chemistry & Biochemistry, Center for NanoSciences

Synthesis of Polyamides for Cervical Cancer Treatment

Poster Presentation

Cervical cancer is caused by the human papillomavirus (HPV), which infects many women each year. Studying different methods of shutting down the virus is a popular area of research. Our research group is synthesizing polyamides, a class of DNA-binding molecules that are specific for DNA sequences corresponding to the binding sites for the viral E1 and E2 proteins in the HPV genome. The E1 and E2 binding sites are involved in controlling viral replication, and E2 is involved in regulating viral gene expression. So, these polyamides are designed to prevent gene expression and replication of the viral genome. Polyamides are made in a similar way to solid phase peptide synthesis, using a solid support resin to build the polyamide by adding one pyrrole or imidazole monomer at a time. The addition of one building block includes deprotection, coupling, and capping steps, with washing between each step, and this is repeated for each successive building block. The finished polyamide is then cleaved from the resin using an acid or amine cleavage. The Wang resin was traditionally used in our lab, but a new resin, CLEAR, was reported to have higher cleavage yields. I synthesized polyamides on each resin and cleaved using different cleavage cocktails. After calculating cleavage yields using high performance liquid chromatography (HPLC), the CLEAR resin gave higher yields for short polyamides, but became gel-like and difficult to work with as the polyamide became larger. The Wang resin worked better for long polyamides even though the CLEAR resin was reported to have higher yields. I was able to conclude that, while the literature on CLEAR resins was correct, it was misleading with respect to the preparation of active anti-HPV polyamides, since the active molecules tend to be rather long (typically with 24 or more building blocks).

Holly Scheibel -- Chemistry
Janet Braddock Wilking, PhD, Mentor
Chemistry & Biochemistry

Reaction of a Dihydridosilole with Platinum-Phosphene Complexes

Poster Presentation

Silacyclopentadienes, also known as siloles, are five-membered ring compounds that exhibit unusual electronic and photophysical properties. Due to these unique properties, siloles are being studied as potential components in electronic devices, and as chemical sensors for nitroaromatic explosives. The majority of the research in this field has focused on siloles with carbon-based substituents. The aim of the current project is to investigate the relatively unexplored area involving the synthesis and properties of siloles containing transition metal substituents. To further the research that has been done, several reactions were performed. First, tetraphenylsilole (1,1-dihydrido-2,3,4,5-tetraphenyl-1-sila-cyclopenta-2,4-diene, 1) was reacted with bis (tri-t-butylphosphine)platinum, $Pt(P^tBu_3)_2$ then was reacted with (dppe)$PtMe_2$ (dppe = 1,2-bis(diphenylphosphino)ethane). The first reaction, performed at room temperature, initially produced the mononuclear complex, *trans*-$(Bu_3P)_2(H)Pt[Si(H)C_4PH_4]$, (2), as determined by multinuclear NMR spectroscopy. After several days, compound (2) decomposed to give a low solubility yellow solid. The identity of the yellow solid is under investigation. The second reaction required heating at 75-80 °C for the reaction to proceed. After being heated, it produced a complex mixture of products. However, the heating may have caused decomposition. Additional reactions are planned with the silole (1) and other transition metal complexes and their photophysical properties will be studied.

Jillienne Touchette -- Biochemistry & Biotechnology

Laura L. Williams, Chemistry, Partner
Michael R. Nichols, PhD, Mentor
Chemistry & Biochemistry

Mutational Analysis of the Alzheimer's Amyloid Beta Peptide

Poster Presentation

Alzheimer's Disease (AD) is a neurodegenerative disease characterized by senile plaques in the brain. Plaques are composed of insoluble fibers of amyloid beta (Abeta) peptides. These peptides are derived from the cleavage of Amyloid Precursor Proteins (APP) that result in either a slower aggregating Abeta (1-40) or a faster aggregating Abeta (1-42). Abeta aggregates through a nucleation dependent polymerization mechanism to form fibrils from monomer species. Intermediate species exist along the aggregation pathway from monomer to fibril called protofibrils and between the monomer and protofibril, which have yet to be determined and researched. Our aim is to purify both forms of Abeta, with mutations in the Abeta(1-40) species. Mutations involve replacing phenylalanine with tryptophan at residues 19 and 4. To analyze intermediates, our objective is to obtain a higher percentage of monomer recovery than aggregated species in the purified form. Through size exclusion chromatography, we separated monomer from larger molecular-mass aggregates. From UV absorbance of eluted fractions, we analyzed recovery of monomer with 11.84 percent for Abeta (1-42) and 20.50 percent for Abeta (1-40) F19W. To prepare for aggregation studies, we optimized the excitation wavelength of tryptophan. We hope to further examine the aggregation characteristics of each form of Abeta through tryptophan fluorescence.

Sean Whittemore -- Chemistry
Christopher D. Spilling, PhD, Mentor
Chemistry & Biochemistry

An Approach to the Synthesis of Cyclipostin

Poster Presentation

Cyclipostins isolated from fermentation broths of streptomyces (sp. DSM 13381) act as inhibitors of hormone-sensitive lipase (HSL), with IC50 in the nanomolar range. Cyclipostins have the potential to be used as a treatment for type II diabetes and are therefore interesting targets for synthesis. Cyclipostins are characterized by a cyclic phosphate triester fused to a lactone ring. Members of the cyclipostin family vary in the structure of the lipophilic chain attached to the phosphate ester. The initial strategy of enolphosphate ring synthesis in the presence of the butyrolactone ring was found to yield none of the desired product. The alternate strategy involving enolphosphate ring synthesis prior to lactonization was found to be successful. The initial strategy is currently being reinvestigated as a potentially more efficient means of synthesizing cyclipostins.

Children's Advocacy Center

Jacob Perkins -- Psychology

Allison E. Pettibone, Psychology, Partner
Marcella A. Chirco, Psychology, 2nd Partner
Megan M. Schacht, PhD, Mentor
Children's Advocacy Services of Greater St. Louis

Maternal Emotional Support & Severity of Trauma Symptomatology in Sexually Abused Children

Poster Presentation

Recent research on childhood sexual abuse has focused on the relationship between maternal support and subsequent difficulties. As a result, relatively little is known about the role of coping in explaining the relationship between childhood sexual abuse, maternal support, and later psychological outcomes. The present study utilizes the Transactional Model (Spaccarelli, 1994) to test the role of coping as a moderating variable in the relationship between maternal emotional support and severity of trauma symptomatology. Participants are male and female children ages 8 to 12 and their biological/adoptive mothers who complete child self-report and parental report measures and are beginning treatment for sexual abuse at the Children's Advocacy Services of Greater St. Louis. We expect to find that coping behaviors will moderate the relationship between the severity of trauma symptomatology and maternal emotional support. If our hypotheses are proven correct, this study would suggest that treatment and prevention interventions should address both maternal emotional support and children's coping behaviors in reducing trauma symptomatology in children who have been sexually abused in an attempt to improve their quality of life.

Economics

Mitch Downey -- Economics

Anne E. Winkler, PhD, Mentor
Economics

An Examination of Key Determinants of Economic Growth in Low-Income Nations

Poster Presentation

In recent decades a new wave of attention has focused on the development of low-income countries suffering from acute levels of poverty and its associated conditions, including disease, starvation and malnutrition, and heightened political instability. Around the world, researchers from universities and nongovernment organizations have investigated what factors lead to such differences in nations' growth and what can be done to help pull some of the world's poorest citizens out of these conditions. Among the most notable of these works was a paper by Craig Burnsides and David Dollar of the World Bank (2000), which is heavily drawn upon for this paper. This study provides a quantitative analysis of the key determinants of economic growth in 47 low-income countries from 2004 to 2005. Some of the factors examined include investment, corruption, and foreign aid. The analysis was conducted using the method of Ordinary Least Squares. The analysis shows a strong impact of foreign direct investment on economic growth, which supports the indispensable role that the private sector development plays in sustainable growth. However, overall conclusions were murky and significant progress remains to be made in the effort to understand how to fuel economies for success.

History

Kathryn Maus
Pamela Neuman

Kathryn Maus -- Psychology

Robert Wilson, PhD, Mentor
History

The Decline of Fairmount Park

Poster Presentation

In the past, racetracks have been a central place for American gambling; however, over time racetracks have been losing money. As a result, racetracks are in danger of going out of business. To see why this is true I read recent newspaper articles on the topic and interviewed officials at Fairmount Park Racetrack in Belleville, Illinois. Analysis indicates that the opening of multiple casinos near Fairmount Park has caused a steady decline in profits and attendance at the track. These declines have caused a shortened racing season and a reduced number of race dates. One possible solution to Fairmount's closing is the passage of Illinois House Bill 2035, which will help Fairmount Park compete with the surrounding casinos for customers by allowing the park to install slot machines. This project links the national trend of racetrack closings to a local establishment, thereby raising awareness about a relatively unknown situation occurring in the St. Louis area.

Pamela Neuman -- Liberal Studies

Robert Wilson, PhD, Mentor
History

A New Sport Comes to St. Louis

Poster Presentation

Professional sports in St. Louis have been in existence for many years. We currently have three major teams. Hockey is represented by the Blues; football, by the Rams; and baseball, by the Cardinals. Each of these represents a traditional sport, having a large fan base and helping to provide an economic base for the St. Louis community. These traditional sports exclude women by allowing only male participants. Women's participation in professional sports in the St. Louis area is limited to horse racing at Fairmount Park. For women in St. Louis who want to compete in sports, the only option is amateur sports. My study examined the Arch Rival Roller Girls and the reemergence of Roller Derby as a women's participatory sport in St. Louis. The research focused on the evolution of (1) the Women's Flat Track Derby Association as it promoted and fostered women's flat track derby through its establishment of standards for interleague competitions and (2) Roller Derby history and its reinvention as it changed from male management, ownership, and operation to female (and player) management, ownership, and operation.

Math & Computer Science

Aaron Hsu -- Computer Science

Martin Pelikan, PhD, Mentor
Mathematics & Computer Science

Unstructured Data and Hierarchical Clustering

Oral Presentation

Many classes of computer-based applications need to quickly analyze large amounts of document-based data into hierarchies of related material. In information systems that collect digital resources, much money and labor are spent on classifying, organizing, and categorizing data. A fast, dynamic method of hierarchical clustering that can run without much human assistance presents beneficial opportunities in E-commerce by handling large amounts of data with improved speed and efficiency, such as automatically organizing and filing a product database for an online store. This presentation intends to examine the core techniques that form the foundation for more advanced study in this area and will identify some intended future research, which includes identifying and labeling clusters, clustering itself, the ability to change clusters by integrating new information into an existing cluster efficiently, and the ability to adjust clusters based on human suggestion and direction. I will examine the various algorithms used for basic clustering andcompare their benefits and disadvantages in light of their intended applications, based on experiments conducted with sample datasets, both artificial and real-world.

Music

Patrick Bergin -- Music Education

Diane Touliatos, PhD, Mentor
Music

Exploring Peruvian Music Through the Eyes and Ears of Gabriela Lena Frank

Poster Presentation

Composers across the centuries have written music inspired by indigenous cultures, historical figures, and ideals. Gabriela Lena Frank is composing music that clearly and consistently reflects such inspiration. This study explores the effects of these influences on her music through the analysis of her string quartet *Leyendas: An Andean Walkabout*, an exploration of traditional Peruvian culture and music. The analysis has been compounded with research about Jose Maria Arguedas, a twentieth-century Peruvian writer who championed the ideal of *mestizaje*, the coexistence of cultures without the suppression of one another. The synthesis of this research demonstrates not only that Frank is inspired by these factors but that understanding them is essential for one to fully appreciate her innovative, ethnomusicological compositions. This study is the beginning of a series of essays that will explore the catalog of this young composer and hopefully assist in bringing her compositions to a more mainstream audience.

Music

Patrick Bergin -- Music Education

Diane Touliatos, PhD, Mentor
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Physics & Astronomy

Melissa Pastorius -- Physics

Erika L. Gibb, PhD, Mentor
Physics & Astronomy

Analysis of Ice Features Toward Three Young Stellar Objects

Poster Presentation

Studying the chemistry of young stellar objects, specifically in the disk and the envelope, can provide a great deal of information on the formation and evolution of stellar systems. We observed several stars in the Rho Ophiuci and Taurus star forming regions. We present evidence for ice features of different molecules using two different instruments. The Spitzer Space Telescope was used to observe the CO2 ice feature at 15.2 micron, and the SpeX instrument on the Infrared Telescope Facility in Mauna Kea, HI, was used to observe the 3.05 micron H2O and 4.67 micron CO ice features. The data presented is for the Taurus star-forming region.

Political Science

Jess Rosner -- Public Policy & Administration

David C. Kimball, PhD, Mentor
Political Science

A Study of Ohio: The At-Risk Assumption & Concealed Weapons Permits

Poster Presentation

Laws that regulate guns in the United States are a hot issue for many people, both for and against. The issue: should the average citizen be allowed to carry a concealed weapon? This study will verify the at-risk assumption done in other studies by looking at the same variables but using data from Ohio by county. The at-risk assumption says that people who are more at risk (or think they are more at risk) of being a victim of violent crime will be more likely to get a concealed weapon permit in order to protect themselves. Data for the at-risk assumption is broken into four hypotheses using the distribution of violent crimes, per capita income, the level of education, and the percentage Anglo to see if citizens are getting concealed weapon permits because they feel they are at risk of being a victim of a violent crime. To verify the at-risk assumption, I collected per capita income, level of education, and the percentage Anglo data from the Census Bureau. The violent crime rates were from the Bureau of Justice Statistics, and the distribution of concealed weapon permits was from the Ohio Attorney General's Office. I examined the data by graphing the distribution of concealed weapon permits against violent crime rates, per capita income, the level of education, and the percentage Anglo. Results indicate that most permit holders are white, live in low crime counties, have an average per capita income of less than $20,000, and do not have a four-year college education. As a result of these findings, this study does not support the at-risk assumption. In the future, I would like to look at Ohio data at the zip code level to see how it compares to the findings of this study, as well as other studies. Since Ohio is very close to the average U.S. socio-demographic variables for income, education, and percentage Anglo, I can generalize from the result of this study to the rest of the United States.

Psychology

Tammie Bush
Michael Freeman
Rebecca Howard
Natalie Kelso
Kuryn Kroutil
Phillip Lintzenich
Jaimi Mathias
Julia Murphy
Jennifer Niehoff
Lindsay Ruhr
Anne Schulenberg

Tammie Bush -- Psychology

Robert H. Paul, PhD, ABPP, ABCN, Mentor
Psychology

A Computerized Assessment of Cognition in HIV-Infected Individuals

Poster Presentation

As treatment options for human immunodeficiency virus (HIV) continue to evolve, there has been a clear need for the development of assessment tools to help physicians and patients manage the multifaceted symptoms and deficits associated with HIV infection. The current study examined the utility of a novel, automated, and computerized assessment of cognitive function among individuals infected with HIV. Patterns of neuropsychological performance and relationships between performance and HIV disease burden were assessed. Participants included 174 individuals, of which 87 were HIV positive (40 female, 47 male). The study also included 87 healthy controls that were matched by age, gender, and education level with the HIV-positive group for comparison of neuropsychological performance. Participant age ranged from 22 to 61 years, with the average age being 43. Average education level was 12 years. Significant differences between HIV-infected individuals and healthy controls were found on tests of timing and executive function. In addition, statistically significant correlations were evident between select cognitive tests and HIV disease burden as measured by CD4 level.

Michael Freeman -- Psychology

Jennifer Lynn Niehoff, Psychology, Partner
Miles L. Patterson, PhD, Mentor
Psychology

The Effect of Cell Phone Use on the Walking Pace of Pedestrians

Poster & Oral Presentation

This study examined the effect of cell phone use on the walking pace of pedestrians. Specifically, we recorded the time it took for pedestrians to walk a short distance of approximately 79 to 186 feet and compared the walking speed of those using cell phones against control pedestrians not using cell phones. Two-hundred-one pedestrians using cell phones and 201 pedestrian controls were observed. The results supported our hypothesis that pedestrians using cell phones walk significantly slower than those not using cell phones, suggesting that cell phone use causes enough cognitive overload to impact even basic motor-skills functioning, such as walking pace. These findings have implications on factors such as social sensitivity to others, information encoding, and safety concerns regarding cell phone use.

Rebecca Howard -- Psychology

Robert H. Paul, PhD, ABPP, ABCN, Mentor
Psychology

Influence of Race and Ethnicity on a Screening Measure for Dementia

Poster Presentation

Previous studies have identified important relationships between race and ethnicity and performance on measures of cognitive function. The impact of race and ethnicity on cognitive measures, intended to identify the presence of dementia, has important clinical ramifications, particularly if psychometric corrections are needed to accurately identify individuals in need of clinical care. The Montreal Cognitive Assessment (MoCA) is a brief measure to identify dementia such as Alzheimer's disease (AD), and while this measure has good sensitivity and specificity, the impact of race and ethnicity on performance has not been examined. In this preliminary study, we examined scores on the MoCA between 21 older Caucasians and 5 older African Americans. Data were obtained as part of a large ongoing study of cognitive function among healthy elderly people. Results revealed that on average Caucasians performed better than African Americans (25.52; SD = 2.4 vs 24.2; SD = 2.8). The difference in performance was not statistically significant, but the power was limited due to the restricted sample sizes. Additional data acquisition and analysis will be necessary to determinate whether current clinical recommendations for the MoCA are appropriate or if corrections to scores will be recommended.

Natalie Kelso -- Psychology

Tristan Robinson, Psychology, Partner
Juliette Mott, Psychology, 2nd Partner
Ryan Walsh, Psychology, 3rd Partner
Steven Bruce, PhD, Mentor
Psychology

Characteristics of Trauma Survivors Who Seek Mental Health Treatment

Poster Presentation

Given the well-established presence of successful, empirically supported treatments for Posttraumatic Stress Disorder (PTSD), research has begun to examine ways to increase the dissemination of these treatments to trauma survivors. The purpose of the present study was to identify the rates and characteristics of trauma survivors who seek mental health treatment, based on a community sample. Data were collected from 557 adult individuals who sought treatment at the Center for Trauma Recovery at the University of Missouri, St. Louis. Clients participated in initial phone screens to assess current symptoms and eligibility for treatment. Treatment consisted of 50-minute individual sessions conducted in accordance with the course of treatment outlined in the *Cognitive Processing Therapy* treatment manual. The sample ranged in age from 18 to 64 (M=35.6, SD=10.5) and was composed of diverse racial backgrounds. More women than men sought treatment (females: 88 percent, males: 12 percent), and significant gender differences emerged for number of treatment sessions attended and for severity of both post-traumatic and pretreatment depressive symptoms, as measured with the Posttraumatic Stress Disorder Symptom Scale (PSS) and the Beck Depression Inventory (BDI). Clients were treated for a variety of trauma types: childhood sexual assault (23.2 percent), adult sexual assault (19.7 percent), traumatic loss (13.5 percent), and domestic violence (9.9 percent)—these being the most frequently reported index events. On average, clients reported experiencing 2.34 traumatic incidents. Consideration will be given to factors influencing treatment completion, including symptom severity, trauma type, and length of time since trauma. Examination of these relationships can inform interventions aimed at increasing treatment-seeking behaviors among trauma survivors.

Kuryn Kroutil -- Psychology

Robert H. Paul, PhD, ABPP, ABCN, Mentor
Psychology

A Diffusion Tensor Imaging Study of Medication Adherence in HIV

Poster Presentation

Combination drug therapy for human immunodeficiency virus (HIV) is effective, but only if individuals exhibit near perfect compliance with the drug regimen. Recent studies have demonstrated that cognitive impairment associated with the virus predicts poor adherence to the medications. The present study investigated whether neural signatures of cognitive impairment, obtained through neuroimaging, predict adherence to combination therapy. Brain integrity was measured using diffusion tensor imaging (DTI), which measures the microstructural integrity of the brain. The primary dependent variable from DTI is fractional anisotropy (FA), which reflects the rate and direction of movement of water in the brain. In the current study, an existing dataset was used to compare medication adherence levels to the FA scores of eighteen HIV- positive individuals. Participants displayed a significant range of CD4 counts with a mean of 407, a mean age of 44 years, and a mean of twelve years of education. Adherence was measured by self-report of number of missed doses in last seven days. Results revealed no significant relationships between FA and adherence to the combination therapy. Importantly, in this sample 83 percent reported perfect adherence for the preceding seven days, and this may have explained the lack of association between the DTI metric and adherence. The accuracy and utility of self-reported medication adherence is discussed.

Phillip Lintzenich -- Psychology

Robert H. Paul, PhD, ABPP, ABCN, Mentor
Psychology

Wii Can Help You Train Your Brain in Minutes a Day?

Oral Presentation

In April 2006, Nintendo released *Brain Age: Train Your Brain in Minutes a Day* to American consumers. The title implies that using this video game can improve brain function. To test this claim, participants were recruited from introductory psychology classes at the University of Missouri–St Louis. Participants included healthy, active male and female students from diverse ethnic and racial backgrounds. Participants did not own a Nintendo game system or the stimulus games. Participants in the control group spent twenty minutes a day playing "Wii Sports," a game not purported to improve brain function. Participants in the experimental group spent twenty minutes a day playing "Big Brain Academy: Wii Degree," a brain stimulation game. Participants were tested with a neuropsychological battery at the onset of the experiment to establish baseline data. The battery was composed of the California Verbal Learning Test-II, Logical Memory-II, Trails A and B, Grooved Pegboard, Letter-number sequencing, and the Stroop task to assess multiple domains of function. At the conclusion of a four-week experimental interval, participants were tested again with the same neuropsychological battery. Demographic and basic health history questionnaires were used as controls for individual differences. Results revealed that the cognitively stimulating video games exhibited a modest beneficial effect on the objective tests of cognitive function. Further studies are needed to examine the efficacy of these programs in the general population.

Jaimi Mathias -- Psychology

Laurie A. Greco, PhD, Mentor
Psychology

Body Dissatisfaction and Eating Behavior: Contributions of ACT Processes

Poster Presentation

Body dissatisfaction is related to unhealthy eating; however, current literature offers little information about the psychological processes that contribute to this relationship. This study investigates the potential contribution to this relationship offered by two psychological processes that are critical to the Acceptance and Commitment Model, more commonly know as ACT. The processes involved were experiential avoidance and cognitive fusion. Unhealthy eating behaviors were expected to be positively related to experiential avoidance and cognitive fusion. Approximately 105 girls (ages 12-14) were recruited from two middle schools in the St. Louis area and were given self-report measures to assess the relevant variables. Results of this study are pending. Findings are expected to produce a clearer understanding of the factors that influence the relationship between body dissatisfaction and unhealthy eating.

Julia Murphy -- Psychology

Ann M. Steffen, PhD, Mentor
Psychology

Aging in Place by Community-Dwelling Seniors: Steady as You Go

Poster & Oral Presentation

The ability of community-dwelling older adults to remain in their own homes ("aging in place") involves a series of safety concerns, including the need to prevent home-based falls that result in serious injury or death. We focused this study on the most problematic and dangerous area of the home: the bathroom. Participants were older adults aged 65-97 years, residents of the same town, and living in single-family homes (owned or rented). These individuals were randomly assigned to either an intervention group (n=89) or an assessment-only control group (n=87). Intervention participants received an informational packet in the mail designed to encourage change toward installation of bathroom safety devices. No materials were mailed to the control group participants. After 8 weeks, all participants completed a postintervention, structured telephone interview. Using the Transtheoretical Model of Change (TTM, Prochaska & DiClemente, 1982), we measured participants' intentions and self-reported behaviors related to installing safety devices. We also examined balance self-efficacy as a correlate of change using the Activities-specific Balance Confidence Scale (ABC, Powell & Myers, 1995). As hypothesized, intervention participants were more likely to hold intentions to install safety devices in the future, compared to those in the control group ($X^2 = 6.6$, $p = .01$); the groups did not differ in actual rates of completed installations. Across all participants, those intending to change showed higher self-efficacy as measured by the Balance Confidence Scale [$t(1, 92) = 1.9$, $p \leq .05$)].

Jennifer Niehoff -- Psychology

Robert H. Paul, PhD, ABPP, ABCN, Mentor
Psychology

A Diffusion Tensor Imaging Study of Cognitive Domains in HIV

Poster Presentation

Previous studies that have examined the relationships between cognition and the microstructural integrity of the brain in HIV-positive individuals have revealed mixed results, and this may reflect the inclusion of individuals with varied disease burden. In the present study we examined this issue in HIV-positive individuals with early central-nervous-system involvement. The microstructural integrity of the white matter was investigated using diffusion tensor imaging (DTI) and cognitive function was assessed with a battery of tests sensitive to HIV-related cognitive impairment. Participants had an average CD4 count of 410.90 (N=20). They completed a computerized battery consisting of tests of attention, motor speed, verbal fluency, and executive function. The primary DTI measure was fractional anisotropy, which reflects the rate and direction of water movement in the brain (a measure sensitive to brain integrity). Global brain fractional anisotropy (FA) scores were compared to scores on tasks of the individual cognitive domains. Results revealed no significant correlation between FA scores and cognitive impairment in this population. These results suggest that among relatively healthy HIV patients, the microstructral integrity of the white matter remains relatively intact.

Lindsay Ruhr -- Psychology
Ernest V. Gervino, ScD, Psychology, Partner
Kamila S. White, PhD, Mentor
Psychology

Panic Attacks with Chest Pain: Independent Predictor or Proxy for Psychiatric Disorder?

Poster Presentation

Panic attacks are common in the general population (Katerndahl & Realini, 1993), and recent research shows that panic attacks are positively associated with increased medical comorbidity (Smoller et al., 2003). The incidence of panic attacks in noncardiac chest pain (NCCP) is unknown, and this may be because the *Diagnostic and Statistical Manual of Mental Disorders,* 4th ed., (DSM-IV) diagnostic criteria for panic attacks preclude some patients from receiving clinical diagnoses of panic disorder (PD). Aims of this study are to (1) document the incidence of DSM-IV panic attacks in this sample (NCCP sample) separate from anxiety disorder prevalence and (2) examine panic symptoms as a proxy variable for DSM-IV Axis I psychiatric disorder comorbidity. The present study examined panic attacks, psychiatric morbidity, chest pain, and life interference in 229 patients with NCCP (M = 50 years, SD = 10.3). The sample was 83 percent Caucasian and 56 percent female. Diagnostic interview findings revealed a psychiatrically heterogeneous sample, of whom 44 percent had a current Axis I psychiatric disorder. A total 147 patients completed the diagnostic clinical interview portion of the study (58 males and 89 females), ages 28 to 78 (M = 50 years). Over half of the sample experienced a clinically significant panic attack (52 percent), and patients with an Axis I disorder reported more frequent and more painful chest pain. They also reported increased life interference and healthcare utilization compared to those without an Axis I disorder.

Anne Schulenberg -- Psychology

Kamila S. White, PhD, Mentor
Psychology

Non-Cardiac Chest Pain and Perceived Stress: Associations and Correlations

Poster Presentation

Non-cardiac chest pain (NCCP) is defined as recurrent episodes of chest discomfort in the absence of a cardiac explanation. NCCP often co-occurs with psychological distress (e.g., anxiety, depression), which has been proposed as an etiological factor (White et al., in press). However, supporting published research is lacking. The neuromatrix theory of pain defines pain as a neurological and psychological perception that directly affects an individual's stress perception and response. This theory also suggests that the damage done by cortisol, which is released during chronic stress, can cause more persistent pain disorders. Aims of this study are (1) to investigate the association between perceived stress and chest pain (i.e., frequency, intensity, and duration) in 229 patients with NCCP and (2) to examine how severely the stress of life and the discomfort of NCCP combine to interfere with life. It is hypothesized that both stress and pain will show significant effects. Cross-sectional data analyses indicate that perceived stress is significantly associated with chest pain (i.e., frequency, $r = .21$, $p < .05$), and the combination of both result in significant life interference ($r = .42$, $p < .01$). Interactions will be examined, and clinical implications for the role of stress in NCCP will be discussed.

Social Work

Deborah Lammert -- Psychology

Fallon Finney, Social Work, Partner
Margaret Sherraden, PhD, Mentor
Social Work

Preventing Type II Diabetes in Low-Income Children

Poster Presentation

According to the American Diabetes Association, there are 20.8 million people in the United States with type II diabetes. The cost of treating diabetes is significant. Missourians spent $3.2 billion on diabetes care in 2004. Type II diabetes, a disease that disables the body from producing insulin effectively, frequently leads to other serious health problems, including disability, high cholesterol, kidney failure, and heart and circulatory disease. Our research analyzes the causes and challenges faced by low-income families in the prevention and treatment of diabetes in their children. Type II diabetes is increasing among African American and Latino children, especially. Although the exact causes of diabetes are unknown, researchers know that genetic factors as well as nutrition, exercise, and other environmental factors are involved. Unfortunately, many people with low incomes do not fully understand how to prevent the onset of diabetes. Furthermore, people with low incomes often lack health insurance, are unable to afford nutritious food, and rarely have a safe place or time to exercise. In conclusion, we offer policy directions for addressing the rising incidence of type II diabetes, including more health education, better access to health care, and better access to good nutrition and exercise in schools and communities.

Sociology

John Luecke
Nicole Marie Pulido

John Luecke -- Sociology & History
Teresa J. Guess, PhD, Mentor
Sociology

Race and Diversity: Code Words for Barriers to Humanitarian Perspectives

Oral Presentation

While there has been a great deal of research done on the subject of race, few researchers have examined how the use of the term "race," and especially the term "diversity," might constitute a worldview that excludes the possibility of egalitarian perspectives. My research explores the use of these terms and how their usage impedes the development of a humanitarian worldview. I will elucidate how these terms are socially constructed and how they serve to propagate the divisive nature of individual and group relations. Using both qualitative and quantitative research, I will explain my conclusions and clarify the origins and definitions of the terms, "race," "diversity," and "worldview." The conclusion I hope to attain through this research is the character of the terms "race" and "diversity" as socially constructed mechanisms that inhibit our ability as individuals to develop a perspective that encompasses humanity as a whole.

Nicole Marie Pulido -- Criminology & Criminal Justice
Teresa J. Guess, PhD, Mentor
Sociology

The Effects of Immigrant Language Acculturation in Relation to Economic Status in the United States

Oral Presentation

Traditional beliefs about immigration say the more American an immigrant becomes the higher chance of success in the host country. Acculturation as a whole is often used as a predictor of an immigrant's success; however, my paper focuses on the extent to which language acculturation strengthens an immigrant's chances for economic success. The focus of this study is to examine how language affects an immigrant's economic status in the United States. My study is informed by qualitative empirical data that I received after interviewing 15 immigrants in the St. Louis area and after reviewing sociological literature on immigration. I expect results to show that language does play a role in economic success.

Index of Presenters

GK *indicates a Golden Key International Honours Society member*
PLHC *indicates a Pierre Laclede Honors Society member*

Cont'd

Cont'd

Mentors

Pamela Ashmore, PhD, Associate Director, Center for Human Origin and Cultural Diversity; Associate Professor, Anthropology

James K. Bashkin, DPhil, Research Associate Professor, Chemistry & Biochemistry and the Center for NanoSciences

Eike Bauer, PhD, Assistant Professor, Chemistry & Biochemistry

Godfrey R. Bourne, PhD, Associate Professor, Biology

Steven Bruce, PhD, Director, Center for Trauma Recovery; Associate Professor, Psychology

Sheliah Clarke-Ekong, PhD, Associate Professor, Anthropology

Joyce Y. Corey, PhD, Professor Emerita, Chemistry & Biochemistry

Alexei V. Demchenko, PhD, Associate Professor, Chemistry & Biochemistry

Erika L. Gibb, PhD, Assistant Professor, Physics & Astronomy

Laurie A. Greco, PhD, Assistant Professor, Psychology

Teresa J. Guess, PhD, Associate Professor, Sociology

Donna Hart, PhD, Associate Teaching Professor, Anthropology

David C. Kimball, PhD, Associate Professor, Political Science

Catherine Koziol, MA, Adjunct Assistant Professor, Anthropology

Jingyue (Jimmy) Liu, PhD, Director, Center for Nanoscience; Professor, Chemistry & Biochemistry and Physics

Rensheng Luo,PhD, Director, Nuclear Magnetic Research Facility; Research Assistant Professor, Chemistry & Biochemistry

Robert J. Marquis, PhD, Professor, Biology

Michael R. Nichols, PhD, Assistant Professor, Chemistry & Biochemistry

Michael Ohnersorgen, PhD, Assistant Professor, Anthropology

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Robert H. Paul, PhD, ABPP, ABCN, Assistant Professor, Psychology

Martin Pelikan, PhD, Assistant Professor, Mathmatics & Computer Science

Megan M. Schacht, PhD, Assistant Clinical Professor; Manager, Clinical Operations with the Children's Advocacy Services of Greater St. Louis

Margaret Sherraden, PhD, Professor, Social Work

Cont'd

Christopher D. Spilling, PhD, Chair, Professor, Chemistry & Biochemistry
Ann Steffen, PhD, Director, Doctoral Program in Clinical Psychology; Associate Professor, Psychology
Keith Stine, PhD, Associate Professor, Chemistry & Biochemistry
Diane Touliatos, PhD, Director, Center for the Humanities; Curators' Professor, Music
Allon Uhlmann, PhD, Assistant Professor, Anthropology
Xuemin (Sam) Wang, PhD, E. Desmond Lee Professor of Plant Science, Biology
Phillip D. Weyman, PhD, Research Associate, Biology
Kamila S. White, PhD, Assistant Professor, Psychology
Janet Braddock Wilking, PhD, Assistant professor, Chemistry & Biochemistry
Robert Wilson, PhD, Lecturer, History
Anne E. Winkler, PhD, Professor, Economics and Public Policy Administration
Bethany Zolman, PhD, Assistant Professor, Biology

Thank you for your support.

We look forward to seeing you next year.