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The
Undergraduate
Research
Symposium

University of Missouri - St. Louis

April 22, 2005

Sponsored by:

Golden Key International Honour Society

Pierre Laclède Honors College

The College of Arts and Sciences

Office of Academic Affairs

Mission Statement

The members of the University of Missouri–St. Louis chapter of Golden Key International Honour Society are committed to the continued development of an annual program that motivates undergraduate students to undertake challenging and scholarly projects. This multidisciplinary event is intended to nurture and elevate student goals by inspiring confidence, refining communication skills, and encouraging shared experience and goodwill between faculty mentors and emerging scholars from our undergraduate population as well as from the broader academic community. Fashioned in the professional model, this event is also intended to enrich résumés and to promote opportunities for graduate study.

As members of Golden Key International Honour Society, we are also committed to the creation of educational opportunities and the evolution 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. Thus, we are pleased in the establishment of the University of Missouri–St. Louis as home base for the Undergraduate Research Symposium, and we welcome scholars from institutions throughout the region to participate in future symposia.



Acknowledgments

We, the members of the University of Missouri–St. Louis chapter of Golden Key International Honour Society, would like to express our gratitude to all the dedicated faculty and administrators who have championed our dreams. Through their dedication and support, we have come to appreciate the exceptional blend of commitment, knowledge, and experience within this institution. In particular, we wish to express our sincere appreciation to the following individuals:

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Dean of The College of Arts & Sciences

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Director of the Center for Teaching Excellence

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Donna Hart, Ph.D.

Lecturer, Pierre Laclède Honors College

And last but not least, thank you to all Honorary Members and faculty who took the time to visit with us and freely offer us the benefit of your experience. You added fuel to our flame. We aspire to your example.

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About Golden Key

Golden Key International Honour Society recognizes and encourages scholastic achievement and excellence among students from all academic fields. The society unites talented undergraduate administrators at chapter and national levels. Golden Key International Honour Society is distinguished by its principles of objective membership criteria, leadership opportunities, scholarships, chapter activities, career assistance, and community service. For more information, contact the faculty advisor, Kathryn Walterscheid, Ph.D., at Pierre Laclède Honors College, (314) 516-5244.

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Anthropology

Disease, Malnutrition, and Death among 19th-Century Subadults: Rural vs. Urban Populations

Presenter: Becky Blum (Anthropology, Senior)

Advisor/Mentor: Pamela Ashmore, Ph.D.

The skeletal remains of two different populations of subadult individuals from historical cemeteries were examined for evidence of disease and malnutrition. According to medical anthropological theories, fewer cases of disease and malnutrition should be present in rural populations compared to urban populations. An urban sample of 31 individuals came from the Second Catholic Cemetery in St. Louis, Missouri, which was in use until 1850. The rural population consisted of 31 individuals from the Grafton Cemetery in Alton, Illinois, which was in use until 1870. A comparative study was conducted to determine which sample had fewer cases of nutrition deficiency and treponemal disease. All skeletons were examined microscopically to determine all underlying paleopathological conditions present. Occurrences of dental hypoplasia and porotic hyperostosis were determined to be major indicators of malnutrition and disease. Nine incidences of malnutrition and disease were identified in the Second Catholic Cemetery sample. Four incidences of malnutrition and disease were recorded for the Grafton Cemetery sample. The rural sample had lower incidences of disease and malnutrition, which supports the theory that subadults living in the rural populations were healthier than those living in urban populations.

Determination of Sex Based on the Morphology of Auricular Area of Posterior Ilium

Presenter: Anna U. Buechter, M.D. (Anthropology and Criminology, Senior)

Advisor/Mentor: Pamela C. Ashmore, Ph.D.

The determination of sex of an individual from features of the skeleton is an essential component of the biological profile that forensic anthropologists establish. Humans exhibit sexual dimorphism in skeletal characteristics. Current academic scholarship regards various anatomical elements of the hip bone (os coxae) as providing the highest accuracy for the determination of sex. A study of the hip bones of 27 individuals from the Second Catholic Graveyard collection, in use in the mid 1840s in St. Louis, Missouri, was conducted. The goal of this research was to develop a visual sex determination technique based on the morphology of the auricular area of the posterior ilium. Three features of the auricular area were examined, scored, and photographed for 18 adult males and nine females. These areas included the preauricular sulcus, postauricular sulcus and juxtaauricular sulcus. An evaluation of the scoring matrix revealed that the preauricular sulcus was the most reliable feature for determining sex. The postauricular sulcus was the next most reliable feature and the juxtaauricular sulcus was the least reliable and most varied structure. Reliable techniques for visual assessment of sex are important for the identification of individuals from skeletal remains.

Modeling Cold Treatment Decisions

Presenter: Lucas Buffaloe (Anthropology, Senior)

Advisors/Mentors: Margo-Lea Hurwicz, Ph.D.; Susan Brownell, Ph.D.

The average adult develops two to four colds each year, and the United States spends billions of dollars annually in an effort to relieve cold symptoms and limit the duration of illness. Although antibiotics, prescription medications, and alternative therapies such as herbal and mineral supplements are available to patients, the most popular forms of treatment for the common cold are over-the-counter medications. The purpose of this study is to reveal how people decide whether or not they will treat their cold with an over-the-counter cold medication. Through interviews and surveys conducted at the UM–St. Louis, this study examines how symptom severity, opinions about the effectiveness of various cold treatments, and access to treatment influence how people choose between over-the-counter medications and alternatives forms of therapy. Once understood, these criteria will be used to create a decision model that is capable of accurately predicting the treatment decisions that people make regarding cold medication.

Ceramic Analysis of the Gateway Academy Site in St. Louis County

Presenter: Mark Cillo (Anthropology, Senior)

Advisor/Mentor: Patti Wright, Ph.D.

This research is an examination of the ceramics recovered from the Gateway Academy Site in West County St. Louis. The site has been left largely unexamined, as a formal report has never been produced by the excavating archaeologists. This site is located at a moderate distance west of such core sites such as Cahokia and the East St. Louis mound complex. It is important that the data from this site be properly analyzed because it could reveal information on the nature of the influence that the Mississippian centers had on such peripheral sites. For the purpose of this research, data has been examined from the all the features excavated at the Gateway site. The data collected includes the ceramic design, decorations, tempering agents, and rim styles. The data is used to determine what changes may have occurred as a result of advancements in technology as a product of the influence from core cultural centers such as Cahokia. The project focuses on three main periods of habitation at Gateway: Late Woodland, Emergent Mississippian, and Mississippian. Comparisons are made between the ceramic data at the Gateway site and the assemblages previously studied from the larger core sites.

The Cholera Epidemic and the Second Catholic Graveyard

Presenter: Desiree Enloe (Anthropology, Senior)

Advisors/Mentors: Pamela Ashmore, Ph.D.; Susan Brownell, Ph.D.

This research investigates the cause of death of individuals from the Second Catholic Cemetery by linking historical documentation with the timing of internments. The significance of this project is to identify corroborating information in order to determine the number of cholera-infected people that lived in St. Louis during the nineteenth century and to document how people rationalized the causes and effects of this disease. It is not possible to prove the presence of cholera from analyzing skeletal materials, but by determining that the individuals were in relatively healthy conditions, it can be inferred that the cause of death may have been attributable to a fast-moving disease such as cholera or influenza. Research conducted at on- and off-campus libraries, as well as the Missouri Historical Society, will aid in illustrating the life experience of Missourians and the impact of cholera during the nineteenth century. Through this research, the probability or likelihood that cholera was the cause of death of individuals interned in the Second Catholic Cemetery collection will be explored.

What's for Dinner?: Historical Archaeology as a Means to Supplement History in the Illinois Country

Presenter: Meredith Hawkins (Anthropology, Senior)

Advisors/Mentors: Timothy Baumann, Ph.D.; Susan Brownell, Ph.D.

Historical documents such as laws and land documents are often viewed as fact. Although such documents can explain limitations of citizens and provide information like occupation, can these documents be relied upon to give accurate information about people of the past? This study uses animal exploitation practices from two archaeological sites in the Illinois Country to show that historical information can often be misleading. Using zooarchaeological information taken at the Cahokia Wedge site in Cahokia, Illinois, and the Laurens site in Randolph County, Illinois, the faunal assemblage was divided into two categories: domestic and non-domestic. Using the biomass for these animals, results show that French colonists openly disregarded laws, and property documents did not accurately reflect foodways in this region.

Dimensional Ratio Variability of Characters in 5th-Century Attic Inscriptions

Presenter: Will King (Anthropology, Senior)

Advisors/Mentors: Michael B. Cosmopoulos, Ph.D.; Susan Brownell, Ph.D.

For this research project, shifts in the dimensional-ratio of characters in fifth-century Attic inscriptions were examined. To represent a broad range of character designs with high frequency, alpha, nu, rho, and sigma were chosen. Their dimensions were measured, and the height-width ratio of each character was calculated. Each character was analyzed according to both inscriptional and temporal dimensional-ratio means. A range of plotted data shows not only variation of dimensional-ratios for each character through time, but also among the samples taken. These products aid in understanding the shifts in the mean dimensional-ratio for each character. Those patterns were further analyzed to conclude that shifts in dimensional-ratio are more variable than previously assumed and do not necessarily correlate with time. This study concluded that a number of highly influential factors prohibit the dating of inscriptions through dimensional-ratios of characters alone; however, the possibility of long-range prediction of a design shift in Alpha was supported. Most significant, when character analyses were compared, the human element of consistency and error was elucidated in a number of ways.

The Art of War: Decorative Symbolism in Reformation Era German and Italian Armor

Presenter: Jessica Strohmeier (Anthropology, Senior)

Advisors/Mentors: Van Reidhead, Ph.D.; Susan Brownell, Ph.D.

This study analyzes the decorative elements present on helmets in the seventy-one examples of plate armor at the St. Louis Art Museum, Metropolitan Museum of Art in New York, and Tower of London. This analysis is an attempt to gain insight into the wealth, status, and religion of German and Italian cultures through an examination of the decoration on artifacts used for warfare. This study includes a thorough examination of previous investigations by persons associated with these institutions, comprehensive assessment of the historical, in-depth research into symbolism and the associated classification systems, and careful analysis of the artifacts themselves. This study expects to find an underlying symbolism common to both countries which, because of their cultural similarities, remains unchanged despite the turbulent events taking place at the time in question. It is also expected that differences that emphasize the discordant atmosphere in religious matters during the Reformation in contrast to the preceding era, as well as differences in symbolic representation between Protestant Germany and Catholic Italy. Furthermore, it is anticipated that a differentiation in the symbolism between the classes in regards to both status and wealth.

Art

St. Louis Walls: Archiving the Fading History of St. Louis Outdoor Advertisements

Presenter: Jenny Heinz (Graphic Design, Senior)

Advisor/Mentor: Andrew Roth

Before the massive explosion of computers and high-tech printers, businesses advertised their products and services by hiring a sign painter who would design on brick walls of buildings. Due to the rapid changes in technology, these signs are disappearing. The modern replacements for the painted signs are billboards and vinyl banners, both of which fail to display character, charm, and aesthetics. This project will attempt to increase awareness of the sign paintings through a demonstration of photographs of these designs throughout the downtown St. Louis area. Also, designs of similar fonts that emulate the styles of such signs will be revealed.

Criminology and Criminal Justice

Restorative Justice

Presenter: Mary Ann Coker (Criminology/Criminal Justice and Sociology, Senior)

Advisor/Mentor: Nancy Shields, Ph.D.

This paper examines the history and philosophy of restorative justice, which emerged in the United States only about forty years ago. Today the official United States criminal justice system is modeled after the Frankish Empire, where the offender's fine is paid to the state or federal government, not the victim. In contrast, restorative justice focuses on the offender acknowledging and taking responsibility for his or her actions and repairing the harm done to the victim and/or the community. The victim plays an active role in this process, although his or her direct involvement is voluntary. The offender is counseled apropos the victim's non-negotiable restitution and/or indemnity request. The paper describes, in detail, such a program that is administered by the Family Court of St. Louis County and concludes with an analysis of the economic effectiveness of restorative justice programs.

Chemistry

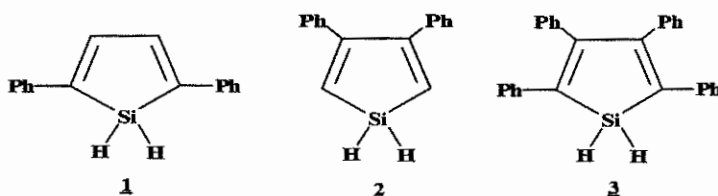
Preparation and Reactivity of Phenyl Substituted Siloles

Presenter: R. Brett Cothran (Chemistry, Senior)

Advisors/Mentors: Joyce Yagla Corey, Ph.D.; Janet Braddock-Wilking, Ph.D.; N.P. Rath, Ph.D.; K.A. Trankler, Ph.D.

Transition metal complexes react with many small molecules by inserting into otherwise generally unreactive X-H bonds, where X can be H, Si, B, C and most recently N. This process, called oxidative addition, is useful for chemical synthesis. Our research group is investigating the activation of silicon-hydrogen bonds by platinum. Compounds that contain silicon-hydrogen bonds are called hydrosilanes. My work is focused on specific hydrosilanes that contain a silole structure. Siloles have a core structure that contains a five-membered ring of silicon and carbon atoms. The three target siloles that constitute my research focus are shown in Figure 1. They differ in the substitution pattern of the functional groups on the ring system.

Figure 1: Target siloles



The synthesis of siloles (1-3) will be discussed, and the preliminary results of the reactions with platinum will be described.

History

Robert Campbell and the Impact of the Fort Laramie Treaty of 1851

Presenter: Josh Newby-Harpole (History, Senior)

Advisors/Mentors: Louis Gerteis, Ph.D.; John Dalzell

This project will use the Fort Laramie Treaty of 1851 as a focal point for an examination of the role that Robert Campbell of St. Louis played in shaping of relations between the United States and the Indian tribes of the Great Plains in the mid-nineteenth century. The Fort Laramie Treaty negotiations brought together one of the largest gathering of Indians in American history. The role played by Campbell and his close associates, Father De Smet, Thomas Fitzpatrick and Jim Bridger, is the central concern of my research. An examination will be done of the interaction of these individuals and the impact of the fur trade on the outcome of the treaty negotiations.

The Postwar Relationship between the U.S. Government and the Aircraft Industry, 1945 - 1956: A Study of the McDonnell F3H-1 Demon

Presenter: Sean Seyer (History, Senior)

Advisor/Mentor: Peter Acsay, Ph.D.

The focus of is research is on the McDonnell Aircraft Corporation and the production of the F3H Demon fighter. Many questionable procurement practices on the part of the Navy resulted in the first 60 Demons produced, the F3H-1, to be written off due to the unreliability of the Westinghouse J-40 engine. These actions took place against the backdrop of the Korean War, when cutting edge fighters were desperately needed. According to both House and Senate investigations, there was no single party at fault, although the total cost of the failed 60 planes was \$300 million and the death of four pilots.

Patriots or Murderers: The Lynching of Robert Prager

Presenter: Kenneth Wilde (History, Senior)

Advisor/Mentor: Peter Acsay, Ph.D.

On April 5, 1918, a German-American immigrant named Robert Prager was forcefully dragged from his home in Collinsville, Illinois, by a mob of miners from the nearby mine in Maryville, Illinois, and accused of being a German spy. He was draped in an American flag while marching through the streets of Collinsville and forced to kiss the flag or sing patriotic songs. After he was rescued by a policeman, the drunken mob stormed the jail, paraded him out of town and lynched him despite assurances of his innocence. The police and the town mayor took no action. The participants in the action were subsequently arrested; however, after a short trial on May 13, 1918, during which a band played patriotic tunes in the courthouse rotunda, all the accused were acquitted on account of darkness at the scene. The affair caused a sensation in Congress and the national press. The question is why did the mob pick on this particular man? Was it super-patriotism, or were there other forces at work?

Language

Coping with the Haunting Questions in *Tonio Kroger* and *Notes from Underground*

Presenter: Rachel Fuchs (Spanish, Senior)

Advisor/Mentor: Maite Nunez-Betelu, Ph.D.

This presentation will address how the two main characters of Thomas Mann's *Tonio Kroger* and Fyodor Dostoyevsky's *Notes from Underground* coped with answering haunting questions. Topics that will be considered include human nature, depravity, the role of the intellect in coping, as well as the effects of relationships on the struggling individual. By investigating these themes, it will become evident that each character complements the understanding of the other. Therefore, the end of this exploration will reveal not only a deeper understanding of these works and the characters therein, but also explore the possibility of an introspective look at how one copes with vast questions and whether each person's measures free or silence the conscience.

Volunteering with the Spanish-speaking Community: Observations and Reflections

Presenters: Antoinette Becerra (Spanish, Senior)

Melanie Kotke (Spanish, Senior)

Tom Noftsinger (Secondary Education, Junior)

Olga Soto (Criminology/Criminal Justice and Spanish, Senior)

Advisor/Mentor: Martha Caeiro, M.A.

In this oral group presentation, the presenters will discuss their current field experiences in two local agencies that serve the Spanish-speaking community of South St. Louis: Acción Social Comunitaria/La Clínica and Southside Catholic Community Services. Both are non-profit organizations that offer various services to new immigrants and refugees in St. Louis, such as low-cost health care, ESL classes, tutoring, and after-school programs. The presenters are currently volunteering in these organizations as receptionists, translators and interpreters, and as tutors and mentors of young children. They will describe these organizations and will give an overview of their programs and the kinds of services they provide to the community. Then, they will discuss the type of work they do as volunteers in these organizations and the people they work with and serve. Finally, the presenters will reflect on what they have learned from interacting with Spanish-speakers and from their overall service experience. The presentation will be given in Spanish.

Serving the Latino Community of St. Louis: Recommendations to the University

Presenters: (GROUP 1)

Erin Block (Psychology, Senior)
Jacob Brown (History and Political Science, Senior)
Anna Jinkerson (Political Science, Senior)
Michelle Osburn (Anthropology, Post-Bac.)

(GROUP 2)

Lauren Bainter (Business Administration, Junior)
Jessica McConnell (Int'l Business and Economics, Junior)
Kelton Pendleton (Sociology, Senior)
Jordan Steffen (Political Science, Senior)
Wei-Hsiang (Thomas) Chang (Int'l Business, Senior)

Advisor/Mentor: Kimberley A. Sallee, M.A.

In recent years, the St. Louis metropolitan area has experienced a significant increase in its Latino population; however, the University's ability to attract and serve this population has not kept pace. Through research and interviews, the two groups presenting have defined this population and the current efforts by the University to reach and attract this portion of the St. Louis community. Each group will discuss their research and the resulting recommendations as to how the University could improve in its ability to reach and serve the Latino community of St. Louis. Discussion of the differences in the recommendations made will take place to jointly present three concrete recommendations to the University administration. The presentation will be conducted in Spanish.

Management and Information Systems

Appointment Systems for Inland Waterway Traffic Control

Presenter: David Long (Management Information Systems, Senior)

Advisors/Mentors: L. Douglas Smith, Ph.D.; Donald Sweeney II, Ph.D.

The Upper Mississippi River-Illinois Waterway carries bulk commodities vital to the United States economy. Tows (tow boats pushing groups of barges) utilize 37 locks and dams to navigate this waterway system. Poor asset utilization leads to frequent delays with potential economic impact. This study examines scheduling and sequencing options to potentially improve the efficiency of the lockage operations. Locks 20-25 provide the basis for the study because of their size and their high level of traffic, relative to other locks. SAS statistical software is used to examine four years of data supplied primarily from the U.S. Army Corps of Engineers. The statistical analysis includes diverse factors, such as night movements, river characteristics, types of vessels, types of lockages, et cetera, to determine their impact on transit times. Equations acquired through the data analysis are used in a simulation model to evaluate the result of implementing scheduling and sequencing rules to minimize queues at locks 20-25. Preliminary analysis indicates the effectiveness of the rules on the entire system will be minimal unless waterway traffic significantly increases.

Anthropology

Spatial and Substrate Use in a Pair of Cotton-top Tamarins (*Saguinus oedipus*)

Presenter: Lisa Bollinger (Biology, Junior)

Advisor/Mentor: Donna Hart, Ph.D.

Cotton-top Tamarins are native to the secondary forests of Colombia and other parts of South and Central America. In the wild, these arboreal primates live in groups of 3 to 9 and travel over a home range exceeding 7 hectares. However, in a captive environment, their lifestyle is much different; the Tamarins are only able to be kept in breeding pairs and they occupy a much smaller area. Since their range is much smaller than their natural habitat, it is imperative to develop containment areas that have the maximum amount of usable space for the Tamarins. This study is evaluating the current spatial and substrate use for a pair of Cotton-top Tamarins at the St. Louis Zoo in relation to specific behaviors; that is, a mapping is done of what activities occur at different quadrants inside their containment area. It is hypothesized that the majority of activity will occur in the upper levels of tree branches since these primates are highly arboreal. At the conclusion of this study, recommendations on how to maximize the usable space in the containment area will be provided.

Visual Contact Episodes between Subordinate Lion-Tailed Macaques and an Alpha Male

Presenter: Sara Caldwell (Biology, Junior)

Advisor/Mentor: Donna Hart, Ph.D.

Dominance in primates is defined as a competitive quality that rarely results in aggression. Through the use of subtle gestures and body language, members of a dominance hierarchy are able to avoid many confrontations. This research project attempts to isolate correlations between the number of times subordinate males look towards the alpha male and their subsequent activities and location. It is proposed that subordinate males will make visual contact more frequently when they are the furthest away from the alpha male and that their rank and the number of visual contacts are negatively correlated. This research was carried out on an all-male group of lion-tailed macaques (*Macaca silenus*) at the St. Louis Zoo. During fifteen hours of research, six activities were selected to be monitored and the number of times each subordinate male looked toward the alpha male was recorded. Each of the three subordinate males was also individually observed for fifteen 20-minute sessions for further associations between visual contact episodes and behavior.

Kin versus Non-kin Relationships in a Captive Group of Female Spider Monkeys (*Ateles geoffroyi*)

Presenter: Rachel Currie (Biology, Junior)
Advisor/Mentor: Donna Hart, Ph.D.

Most primates live in large social groups made up of closely related kin and newcomers that spend significant amounts of time foraging, grooming, and participating in social activities with one another. Neotropical spider monkeys (*Ateles geoffroyi*) in the wild live in a social group made up of many males and many females that break into variable subsets for foraging. Males often remain with their natal group while females tend to emigrate to a new group at sexual maturity. In captive populations the opportunity to emigrate at free will is nonexistent, therefore females may retain relationships with close kin after maturity. It is hypothesized that female spider monkeys in captive populations may show no kin preference and may spend equal amounts of time with members of the group that are related and non-related. In this study, 15 hours will be spent observing a group of three female spider monkeys at the St. Louis Zoo. The group is comprised of one adult mother, one adult daughter, and one adult non-related female. Also, 7.5 hours will be spent observing the females using scan sampling every 30 seconds and recording behaviors that indicate relationship preferences at each time interval. Additional observation of the females for another 7.5 hours will be necessary for recording of the exact duration that each female spends with the other members of the group. Analysis of this data will include the use of statistical tests to calculate the frequency of preferential behaviors and the duration of time different dyads of females are interacting.

Women on the Frontier: A Re-examination of the Fort Zumwalt Site in St. Charles, Missouri

Presenter: Audrey Dismuke (Anthropology and History, Senior)
Advisor/Mentor: Timothy Baumann, Ph.D.

Eighteenth-century Missouri was wild and unstable, yet women streamed into the region at a rate equal to that of men. This paper re-examines historical documentation and artifacts from archaeological excavations at Zumwalt's fort in St. Charles, Missouri. Previous investigators of the site made broad generalizations about cultural processes effecting life on the frontier, but these investigators failed to include women's roles in the development of frontier models. Built during the 1790s, Zumwalt's fort was not a military fort but a fortified homestead. For this reason alone, it is important to consider women's roles in an investigation of the site and its connection to frontier life. Women's lives and contributions were critical to frontier development. In addition to the daily work necessary for survival, these contributions included starting schools, charities, churches, businesses; interacting with Native Americans; and running household business and agriculture. Common views of women's work did not develop until the 1830s, but these views continued to influence archaeological interpretations of women's roles through all time periods. This study confirms the importance of women's lives to the formation of cultural models of the past.

The Homeless Don't Want Your Homes: One Organization's Attempt to Empower the Disadvantaged

Presenter: Amy Cristine Gomwa (Anthropology, Senior)

Advisors/Mentors: Van A. Reidhead, Ph.D.; Susan Brownell, Ph.D.

Homelessness is a human crisis that plagues every city in America. In response to the disenfranchisement that poverty creates, organizations have been set up to give homeless people what non-homeless people have with the assumption that this is what they need. This paper examines an organization, not affiliated with the church or state, that is making the attempt to empower a marginal group of people in St. Louis, as a part of the North American Street Newspaper Association's effort to offer an alternative to pan-handling. The group of citizens who is supported by the social justice publication has been categorically described, by society's rigid definition, as homeless. Building on the words, experiences, and actions of this group of people, this paper aims to explore how and why these people construct their reality and their respective relationship to their own definitively homeless situations. This paper will also examine the impact of *Whats Up Magazine* on their realities. It is important to examine this radical attempt to support impoverished people and to look at the varying results that the street newspaper effort creates. Furthermore, a look at the everyday lives and experiences of people who live and work on the downtown streets is essential in creating realistic means of battling homelessness. When one's current living situation is created from a lack of options, and one organization offers freedom and power in a way to get off the streets, then what is the conclusion?

Evaluating Cranial and Post-Cranial Ethnic Markers in Skeletal Remains

Presenter: Christopher J. Guilford (Anthropology, Senior)

Advisor/Mentor: Donna Hart, Ph.D.

In order to identify ethnicity in skeletal remains, certain cranial and post-cranial measurements and qualitative assessments (called ethnic markers) are commonly employed. Twenty-three of these markers (twelve qualitative and eleven quantitative) was pinpointed and photographed using skeletal remains from seven individuals in the Second Catholic Cemetery collection. Students in biological anthropology human variation courses at the UM-St. Louis employ these same twenty-three ethnic markers to calculate predictability percentages for three broad categories of ethnicity (Asian, African, and European). These predictability percentages were analyzed, and the quantitative measurements were crosschecked with the University of Tennessee FORDISC computer database. Results show that both quantitative and qualitative ethnic markers have a low dependability for establishing the ethnicity of an individual postmortem.

Culture Sequences of the Northern Ozarks: an Environmental Look into the Prehistoric Cultures and Sacred Landscapes of Phelps and Maries County

Presenter: Eric Gustafson (Anthropology, Senior)

Advisors/Mentors: Timothy Baumann Ph.D.; Susan Brownell Ph.D.

Located in the center of Missouri is the Gasconade River Basin, which represents the state's most diverse karst region. The Gasconade River Basin is not just unique for physiographic settings but also the archaeological record found within; it contains a record temporally different to others in Missouri. There is strong evidence for occupation during Archaic and Late Woodland periods, but little evidence for other periods found elsewhere in Missouri. An examination of the environmental settings and collections from two cave sites found in Phelps and Maries County was done to find reasons for this gap in the record. Occupancy of these caves was found by reanalyzing the lithic and ceramic artifacts from excavations done by Bruce McMillan. These findings were then compared to findings from the Miller cave complex and the Lohraff cave complex; both likely represent Late Woodland settlement patterns in the Northern Ozarks. By looking at physiographic settings and symbolism of the area's landscape, the sequential gap in the record can be understood due to the environment's relative isolation.

Neighbors as Entertainment: Why Do Spider Monkeys at the St. Louis Zoo Watch Ring-Tailed Lemurs?

Presenter: Richard Harris (Biology, Senior)

Advisor/Mentor: Donna Hart, Ph.D.

The enclosures for the spider monkeys (*Ateles geoffroyi*) and the ring-tailed lemurs (*Lemur catta*) at the St. Louis Zoo are adjacent to each other. The spider monkeys (three adult females of varying ages) can often be observed intently watching the ring-tailed lemurs, an activity that is not reciprocated. The purpose of this study is to determine (1) how much time the spider monkeys watch the lemurs in comparison to other activities, (2) which lemur behaviors interest the spider monkeys, and (3) which of three spider monkeys is most interested in the lemurs. The data were collected by instantaneous scans every thirty seconds, combined with recording all occurrences of relevant behavior. It is hypothesized that the spider monkeys will be most attracted to very active lemur behaviors and that there are significant differences among the three spider monkeys in regard to time spent watching the lemurs.

Age and Health as Determining Factors of Prehensile Tail Use in the Black-Handed Spider Monkey

Presenter: Lee Hasegawa (Anthropology, Senior)

Advisor/Mentor: Donna Hart, Ph.D.

The purpose of this study is to assess the prehensile tail use of three black-handed spider monkeys (*Ateles geoffroyi*) to determine if age and health play a factor in dependence on this appendage. Data will be collected over a period of fifteen hours utilizing instantaneous scan sampling to chart and compare the frequency and type of tail usage in the study group. Research will be conducted at the St. Louis Zoo, which is home to three female black-handed spider monkeys: one old adult with numerous health problems, one mature adult in relatively good health, and one prime adult in good health. The results of this study will analyze tail use in individual monkeys to ascertain whether prehensile tail use declines or increases in conjunction with compromised physical condition.

A Study of Music Performance: Insights into the Contemporary Perceptions of Race According to Skin Color

Presenter: Gretchen Marie Haupt (Anthropology, Senior)

Advisor/Mentor: Donna Hart, Ph.D.

In the scientific community, it is generally agreed that there are not separate biological human “races.” Nevertheless, race continues to exist as a social construction. In order to discern how freshman students at the Pierre Laclède Honors College at UM–St. Louis would categorize individuals on the basis of skin color alone, respondents were asked to organize color chips (representing skin tones) from lightest to darkest and into groups associated with four stereotypical racial color divisions (white, black, Asian, Native American). This project examined the (1) degree of variability in the “lightest to darkest” organization, (2) number of people who indicated portions of one color category overlapped into another, (3) difference in the number of colors assigned to the respective categories, and (4) basic demographic variables of the respondents (age, sex, and reported racial affiliation). The purpose of this project is to show the variability in the ways individuals choose to racially categorize other people and that skin color is an unreliable factor when it comes to completing this task. While much research has been conducted regarding race relations, little has been devoted to how people think about race in relationship to skin color. It is important to analyze the ways people organize the world around them.

A Study of Music Performance: Insights into the Contemporary Folk Music Scene

Presenter: Michael Jonas (Anthropology, Senior)
Advisor/Mentor: Margo-Lea Hurwicz, Ph.D.

The United States has a rich history of music that was inspired by early immigrants. Europeans and Africans who came to this country brought with them a diverse musical heritage, bringing folk songs and folk instruments like the mandolin, banjo, and guitar. As diverse cultures from around the world began to intermingle, so did their music. Eventually a distinct genre was created, known as American folk music. This presentation will give an overview of the anthropological literature on folk music, including works of ethnomusicology, anthropology of music, functionalism, and other key publications. Many of these works have overlooked the cultural context of music. This research aims to fill the gap by studying music enjoyment and performance within the cultural context. Systematic research, in the form of surveys, focused on audience behavior and response to music across venue type. This research concludes that there is a framework within the folk music culture that determines acceptable and unacceptable behavior; a set of long standing traditions that are evident in songs and activities; and a large network of individuals that help inculcate these values.

Age-Graded Comparison of Prehensile Tail Use in Mantled Howler Monkeys

Presenter: Lana Kerker (Anthropology, Junior)
Advisor/Mentor: Donna Hart, Ph.D.

An interesting feature of some platyrrhines, including the neotropical mantled howler monkey (*Alouatta palliata*), is their prehensile tails. This study focuses on comparing the differences in prehensile tail use between adult and juvenile mantled howler monkeys. Through the use of a list of five common tail postures, it is hypothesized that the juveniles would use all five of the postures more frequently than the adults who would use a lesser repertoire of positions. This study was conducted on Ometepe Island, Nicaragua, from July 4-12, 2004. Focal animal scan sampling was used to record behavior, tail position, canopy level, and substrate size every 30 seconds for a ten minute period per animal. A total of 34 adults and 29 juveniles were assessed; adults spent 77% of the time using only two of the postures while the juveniles spent 61% of the time using the same 2 postures and 39% of the time using the other three. These results validated my original hypothesis and may be a result of differences in the activity budgets of adults and juveniles. Future studies on juvenile development in howler monkeys, as well as other primates with prehensile tails, will be enhanced by data on tail positions.

Locomotor Development of an Infant Sifaka (*Propithecus verreauxi coquereli*) at the St. Louis Zoo

Presenter: Jaime LaVelle (Anthropology, Senior)

Advisors/Mentors: Donna Hart, Ph.D.; Susan Brownell, Ph.D.

This study aims to trace the locomotor development of an infant sifaka (*Propithecus verreauxi coquereli*) during its first year. Locomotor development can be determined by presence and frequency of locomotor types exhibited over time. Sifakas have evolved morphologically as specialized vertical clingers and leapers. This form of locomotion requires sophisticated coordination and has enabled them to take full advantage of their environment and is imperative to their survival. This study consists of sixty hours of data collection. Data were collected using instantaneous scan sampling technique on two focal animals, an infant and a young adult sifaka. The young adult sifaka was used as a control to test the significance of the findings on the infant's locomotor development. The first month of an infant sifaka's life is spent clinging to its mother's chest. After the first month it transfers to the mother's back, which it gradually leaves to test its locomotor skills. During instantaneous scan sampling locomotor types exhibited every 30 seconds were recorded for both focal animals. The findings of this study should demonstrate that over time, an infant spends less time clinging to its mother and gradually increases demonstration of typical sifaka locomotor types.

Correlation of Behavior to Female Dominance in Hamadryas Baboons

Presenter: Ellen Morrison (Biomedical Engineering, Freshman)

Advisor/Mentor: Donna Hart, Ph.D.

This study examines how selected behaviors correlate to social dominance in female hamadryas baboons (*Papio hamadryas*). An examination of the fluctuating dominance structure in a group of four female baboons at the St. Louis Zoo was done. While an existing social hierarchy has been stable for several years, a young female currently may be working her way to a higher rank. Important factors in female dominance include grooming partners, close relationship with the dominant male, and prime access to food. Dominance was measured in my study by observing grooming dyads and average proximity to the dominant male by the focal females in my sample. In addition, all occurrences of access to food, as well as the order and behavior of the females while eating, was noted.

How Ruffed Lemurs (*Varecia variegata*) Interact with Their Environment

Presenter: Sarah Mulqueeny (Psychology, Senior)

Advisor/Mentor: Donna Hart, Ph.D.

Lemurs, as prosimians, are separated taxonomically from anthropoids (monkeys and apes). One of the so-called primitive traits in prosimians is the retention of heavy dependence on a sense of smell. The purpose of this research is to observe how one species of prosimian, the ruffed lemur (*Varecia variegata*), uses different senses to assess its environment. Through observation of a population of ruffed lemurs at the St. Louis Zoo, the study measures the lemurs' responses to five different objects in terms of olfactory, visual, and tactile reactions. Because of the presence of a rhinarium and a long muzzle that restricts the lemurs' ability to see stereoscopically, it is hypothesized that ruffed lemurs will respond more often to new stimuli in their environment using their olfactory senses. The implications for enrichment activities arising from this study are also discussed.

The Role of Eye Contact among Male Lion-Tailed Macaques (*Macaca silenus*)

Presenter: Ronald L. Pallmann (Anthropology)

Advisor/Mentor: Donna Hart, Ph.D.

Lion-tailed macaques (*Macaca silenus*) are Asian cercopithecine monkeys. They generally live in social groups of ten to twenty animals in the wild. Multiple adult males in a group are common. The St. Louis Zoo exhibits a group of eleven lion-tailed macaques; three of the animals are adult males. This research concentrates on how the males in this group communicate with each other and the females by means of eye movement and contact. Each male was observed as a focal subject during periods of thirty minutes each. Eye contact with other members of the group, as well as any behaviors that are in response to eye contact, was recorded. In addition, each incidence of eye contact between any male and any other member of the group was noted. This study will document the extent to which cause and effect might be attributed to eye contact.

Subadult Osteological Developmental Processes

Presenter: Stephen Pobst (Anthropology, Junior)

Advisor/Mentor: Donna Hart, Ph.D.

Twenty-five subadult human skeletal remains from the nineteenth-century Second Catholic Cemetery collection were analyzed and inventoried in order to ascertain developmental processes of ossification visible in the long bones of the leg. These developmental processes are reflected by measuring the length of the long bones and by assessing the degree of epiphyseal union (i.e., growth plate closure at the end of the bone as cartilage is slowly replaced with bone). Age of individuals can be assessed by developmental processes since there is a correlation in humans between age and long bone growth and epiphyseal union. The femur is a particularly good element to analyze when aging an individual because growth of the femur starts before birth and epiphyseal union is not completed until 25-30 years. This study analyzed fifty subadult femurs and compared them to paradigms for development found in the scientific literature.

Football and Development of Life Skills

Presenter: David Poncioli (Anthropology, Senior)

Advisors/Mentors: Margo Hurwicz, Ph.D.; Susan Brownell, Ph.D.

The purpose of this research was to explore through ethnographic data, the idea that playing sports, especially high school football, helps young men to feel more mature. Participant observation and systematic data collection techniques were used to gain ethnographic data from the high school varsity football players at John F. Kennedy Catholic School. In addition to completing a 4-page survey, the team and coaches were observed and informally interviewed both on and off the field. The research concludes that the football players felt that many aspects of their lives were positively influenced as a result of being on the team. From freshman year to senior year, there was a progression in perceived maturity of the young men in terms of relationships, attitudes, priorities, and life skills.

Male Alloparenting in Dusky Leaf Monkeys (*Trachypithecus obscura*)

Presenter: Anna Schrader (French and Sec. Ed., Junior)

Advisor/Mentor: Donna Hart, Ph.D.

A two-year-old juvenile was recently transferred into an exhibit at the St. Louis Zoo already containing a fully-grown, male dusky leaf monkey (*Trachypithecus obscura*). This research investigates the relationship between the two monkeys and the potential for alloparenting (i.e., nurturing behavior toward an unrelated youngster) in an older male dusky leaf monkey. Through the recording of all occurrences of certain behaviors and the duration of both agonistic and affiliative behaviors, this study measures the interactions between the adult and juvenile monkey to see (1) how long they interact, (2) what kind of interactions they exhibit, and (3) who initiates the interactions. In this species, it is uncommon for a wild adult male to exhibit any interest in infants or juveniles, while bonding between juveniles and mothers is very frequent. It is hypothesized that in a captive situation, an adult male may have considerable interaction with a juvenile, including much affiliative behavior.

Interspecific Interactions between White-Faced Sakis, Golden-Headed Lion Tamarins, and Pygmy Marmosets

Presenter: Xilu Zhang (Int'l Business, Senior)

Advisor: Donna Hart, Ph.D.

This study was conducted to ascertain the degree and type of interspecific interactions between three Neotropical primate species in captivity: white-faced sakis (*Pithecia pithecia*), golden-headed lion tamarins (*Leontopithecus rosalia chrysomelas*), and pygmy marmosets (*Cebuella pygmaea*). Fifteen hours of data were collected. Three methods of data collection were used: focal time sampling (placing all the animals at a particular three-dimensional area of the display every minute), nearest neighbor scans (recording distance of the animals from each other every five minutes), and all occurrences of certain behaviors (documenting all interspecific behaviors). These results show that animals of the same species were more likely to be in the same areas of the display than with animals of another species. Also, the results reveal that animals of the same species tended to be closer to each other in distance than to animals of another species. In addition, most of the interspecific interactions observed were agonistic.

Biology

Variation in Expression of Lekking across 6 Species of Manakins

Presenter: Lisa Bollinger (Biology, Junior)

Other Researchers: Kelly Halbert (Lab. Research Associate in Biology)

Renate Ribiero (Doctoral candidate in Biology)

T. Brandt Ryder (Doctoral candidate in Biology)

Wendy Tori (Doctoral candidate in Biology)

Advisors/Mentors: Patricia Parker, Ph.D.; Bette Loiselle, Ph.D.; John Blake, Ph.D.

Manakins are small forest birds endemic to South and Central Americas. The majority of the species display some type of lek breeding system, where males gather together and perform displays in order to attract females. Females choose a mating partner among the males and then leave to carry out the rest of the reproductive activities alone. A group of UM–St. Louis investigators are exploring the variation in expression of lekking across 6 species of manakins in the Amazonian rainforest of eastern Ecuador and the distribution of reproductive success among males within lekking groups. This research requires finding genetic markers that will enable us to understand the kinship patterns among males within and between lekking groups, to conduct paternity analyses of chicks to measure the actual reproductive success of males compared with other males in their group, and to compare reproductive success as a function of behavior parameters. The contribution of this study to the overall project involves the screening of microsatellite loci to find those loci with appropriate levels of variability. Moderately variable markers are needed to identify differences among leks and highly variable markers are needed to identify differences between males of the same lek. This research is ongoing.

Hydrogen Production Using Cyanobacteria

Presenter: Martin Engqvist (Biology, Junior)

Advisor/Mentor: Teresa Thiel, Ph.D.

To decrease the oil dependence of industrialized countries, renewable sources of energy must be found. One fuel with great potential is hydrogen gas. Already one can buy cars that run using this fuel. Today the main problem with hydrogen gas technology is to produce the gas in a cheap and environmentally sound way. In Dr. Thiel's lab, we see the potential of cyanobacteria to solve this problem. These are bacteria capable of using sunlight for energy by the process of photosynthesis. They are also able to convert nitrogen gas from the air into a fixed form. This, in itself, is a very important process since all living things require nitrogen in a fixed form for survival. In this nitrogen fixing reaction, hydrogen gas is produced as a useless by-product for the bacteria. We envision using different molecular biological approaches to increase the yield of hydrogen gas produced by these bacteria. This mainly includes modifying the enzymes responsible for the hydrogen-producing reaction and modifying the expression of the genes that produce the hydrogen. This particular study focuses on the gene *hupSL*. This gene encodes a protein that is responsible of breaking down hydrogen gas in cyanobacteria. Discovering what regulates the gene and which factors turn the gene on and off will be used to increase the yield of hydrogen gas in cyanobacteria.

Hard Seed: The Effects of Seed Scarification on Germination Rate in *Callirhoe bushii* (Bush's Poppy Mallow)

Presenter: Meredith Gosejohan (Biology, Senior)

Advisors/Mentors: Patrick Osborne, Ph.D.; K.A. McCue

Callirhoe bushii is ranked as S2 by the Missouri Department of Conservation, imperiled in the state because of rarity or because of some factor making it vulnerable to extirpation from the state. Previous propagation attempts have shown *C. bushii* seeds to germinate over long periods of time. In order to ensure the existence of *C. bushii* populations in Missouri, a reliable ex situ protocol for propagating the seeds is necessary. The effects of seed scarification techniques on germination rate in *C. bushii* were examined in this experiment. Three methods of scarification were tested in an attempt to break the physical dormancy of *C. bushii* seeds: wet heat, razor blade cut, and combined razor blade cut with a wet heat soak. Seeds in each of the treatment groups and a control group germinated. Treatment appears to have no significant effect on germination rate. Germinations continued to occur over 307 days from the time of sowing. The results suggest that *C. bushii* seeds may have both physiological and physical dormancy.

PCR Diagnosis of Trypanosomes in the Galapagos Hawk

Presenter: Jennifer Stauber (Biology, Senior)

Advisors/Mentors: Patricia Parker, Ph.D.; Noah Whiteman; Kelly Halbert

A trypanosome (*Trypanosoma sp.*) was recently detected for the first time in the Galapagos Islands within a Galapagos Hawk (*Buteo galapgoensis*). Trypanosomes are not easily detected by microscopy, as chronic infections typically exhibit low parasitemias. To circumvent this problem, a PCR test was optimized for diagnosing previously collected hawk blood samples, in order to characterize trypanosome prevalence. A conserved region of the trypanosome SSU rRNA gene was successfully amplified; however, repeated PCR testing of an infected sample produced high percentages of false negatives, indicating parasitemias in the hawk may be below the test's sensitivity threshold. Extremely low parasitemia was confirmed by microscopy. Thus, the lab is beginning trials to enrich samples prior to amplification using sequence-specific capture to concentrate parasite DNA and separate it from the more prevalent, but irrelevant, hawk DNA. To verify the PCR product's identity, DNA sequencing was performed. A BLAST search showed the sequence matches other trypanosome sequences on Genbank. Specifically, it is nearly identical to isolates from raptors and putative vectors from Eastern Europe, though morphology suggests this trypanosome may be an undescribed species. Eventually, this study hopes to use PCR to amplify the entire gene, including more variable intragenic regions, and place it phylogenetically.

Chemistry

Effects of the Glycoalkaloid Tomatine on Lipid and Cholesterol Monolayers

Presenter: Joy Duff (Chemistry, Senior)

Advisors/Mentors: Keith Stine, Ph.D.; Barry Walker

This research involves the study of monolayers using surface pressure and Brewster Angle Microscopy (BAM). A monolayer is made by applying molecules onto water that have a hydrophobic end that repels water and a hydrophilic end that attracts water. The hydrophilic end, which is the head group, gathers at the surface. This study will compare mixtures of cholesterol and a lipid, specifically the phospholipid DMPC and the sphingolipid egg-sphingomyelin. Under these conditions a monolayer represents a model for a biological cell membrane. To study the effect of toxins that effect biological cells, a glycoalkaloid, tomatine that is found in tomatoes, was chosen and injected under the monolayer. The tomatine toxin binds to the cholesterol present in the membrane and disrupts its integrity. As the toxin affects the monolayer, the surface pressure increases. It is hypothesized that the surface pressure should increase more with a mixture of cholesterol and phospholipid DMPC than with the mixture of cholesterol and egg-sphingomyelin due to the expected weaker interactions of cholesterol with DMPC.

The Synthesis of Heterocycles Containing Silicon Centers

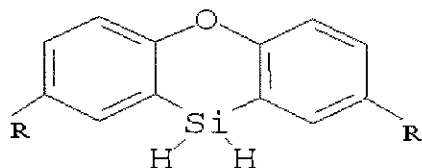
Presenter: Shui Yao (Chemistry, Senior)

Other Researcher: E. Choi (Chemistry, graduated)

Advisors/Mentors: Joyce Yagla Corey, Ph.D.; Janet Braddock-Wilking, Ph.D.

This project involves the preparation of heterocycles containing silicon centers with exocyclic SiH bonds (secondary silanes). The silanes produced will be used for studies of oxidative addition of the Si-H bond to a platinum center. One approach to the preparation of heterocycles such as that shown in Figure 1 is through a dilithium reagent generated from an organic dibromide precursor. The dilithium reagent is then quenched with SiCl₄ followed by LAH or LAD, to provide the target heterocycle with Si-H or Si-D bonds. Several trials of heterocycle formation with various R groups (R= H, Me, tBuMe₂Si) have been performed in the last 6 months of undergraduate research. In addition, another system has been more recently studied that contains a N instead of O in the heterocycle leading to the preparation of the new compound 2.5.8-Trimethyl-10.10-dihydrophenazasilin-d₂.

Figure 1:



The Analysis of Sunscreens and Their Ability to Block UV-A and UV-B Rays

Presenters: James Tisdell Banto (Chemistry, Senior) Jesse Meinhardt (Chemistry, Senior)
Alan Baur (Chemistry, Senior) Heather Talent (Chemistry, Senior)
Patrick Fitzgerald (Chemistry, Senior) Joe VanArtsdalen (Chemistry, Senior)
Gregory Kilper (Chemistry, Senior) Arthur Wilde (Chemistry, Senior)
Lindsay Mangum (Chemistry, Senior) Shui Yao (Chemistry, Senior)

Advisor/Mentor: James O'Brien, Ph.D.

Much evidence indicates that overexposure to the sun in the first twenty years of one's life can greatly increase the incidence of skin cancer. This study examined the different aspects of commercial sunscreens in an attempt to verify the presence of active ingredients, the ingredients that absorb and ultimately block the sun's harmful UV-A and UV-B rays. The sunscreens were analyzed for the proper concentration of the active ingredients, and the ability of these active ingredients to block the sun's harmful UV-A and UV-B rays was then determined. In this study, the techniques of high pressure liquid chromatography (HPLC) and UV-Visible spectrophotometry were employed to look at the different aspects of the analysis of sunscreens. Since the sun's UV-A (320-360 nm) and UV-B (290-320 nm) rays are the ones deemed harmful, this analysis was performed in the 260-360 nm range. The proportionality of the UV absorbance was then evaluated in this range, per unit mass, versus the claimed sun protection factor (SPF) value. All analyses were quantitative ones based on the Beer-Lambert relationship, and this was verified using absorbance versus concentration plots through the analysis. It was found in this study that the stated SPF value of a sunscreen is not necessarily an indicator of its ability to absorb UV-A and UV-B rays, or of its effectiveness. Sunscreens of a lower SPF value often absorbed a greater amount of UV-A and UV-B rays than did sunscreens of a higher value. It was found that cost was not a good indicator either. All sunscreens analyzed in fact did not completely block all rays in the UV-A and UV-B range.

History

Old North St. Louis Project

Presenters: Colleen Buckley (Sec. Ed. History, Senior)
Sarah Rutlerford (Sec. Ed. History, Senior)
Julie Strassman

Advisors/Mentors: Louis Gerteis, Ph.D.; Catherine Van Hook

This project deals with salvaging homes through the restoration group of Old North St. Louis and will demonstrate methods for researching information on the history of homes. In order to save two particular homes in Old North St. Louis (1300 and 1308 Monroe Street) from being demolished, extensive research has been done at Mercantile Library, the Missouri Historical Society, the St. Louis County Headquarters Library, and the Olive Branch Library in downtown St. Louis. Information such as fire insurance maps, census records, city directories, Civil War record books, obituary records from old newspaper articles, and websites on genealogical information will provide support for salvaging the two properties through to the Old North St. Louis Restoration Group.

Pandering to the Panic: Exploring the Responses to the St. Louis Cholera Epidemic of 1849

Presenter: Lauren Glenn (Sec. Ed. History, Senior)
Advisor/Mentor: Peter Acsay, Ph.D.

The 1849 cholera epidemic was the worst to hit St. Louis during the 19th century. It is estimated that a member of every family in St. Louis died during the outbreak that occurred following the influx of immigrants into St. Louis during the 1840s. As a result of the massive loss of life, the people of St. Louis responded to the outbreak through a series of reactions that altered the geographical, political, social, and economic life of the city. In the event of a traumatic event such as the cholera outbreak, humans tend to react through various means such as panic, blame and religious fervor. The city of St. Louis was no exception. This project aims to explore the various reactions of the people of St. Louis to the cholera outbreak based on a blueprint of psychological explanations for those reactions. The movement of cemeteries, the overthrow of the Democratic Party, the native/immigrant tensions, and the creation of a public works and sewer system in St. Louis are some of the examples that will be used to support the thesis. The responses that occurred during the outbreak and the reasons for such reactions will be examined.

Building Up St. Louis: Busch Stadium

Presenter: Tony Holm (Sec. Ed. History, Senior)
Advisor/Mentor: Peter Acsay, Ph.D.

The construction of Busch Stadium had a very positive impact on the economy of St. Louis and a crucial role in the revitalization of St. Louis in the 1960s. First, this presentation will examine of the history behind the necessity of the construction of Busch Stadium. To ascertain the reaction of inhabitants of St. Louis to the construction, an exploration of the financial issues of the Busch Stadium construction will be done. Also, this presentation will reveal the revitalization of downtown St. Louis due to the new stadium and the Gateway Arch, which brought new businesses to the city. Photographs and statistics will be provided to support these claims, along with a comparison between St. Louis and other cities with similar situations, regarding the construction of new stadiums.

The Spanish Influenza of 1918-19 in St. Louis

Presenter: Patty Ikemeier (Sec. Ed. History, Senior)
Advisor/Mentor: Peter Acsay, Ph.D.

This research deals with the Spanish Influenza of 1918-19 on an international, national, and local level and asserts that actions taken by officials in St. Louis prevented the spread of the flu and a high number of deaths. This assertion will be proven through comparison of St. Louis and cities of similar size and population. Other topics that are explored include the reasons why the flu spreads so quickly and widely and why it was so deadly for young, otherwise healthy males. Along with photographs, statistics, and quotes from doctors, politicians, a timeline that compares St. Louis to the rest of the United States will also be presented.

Mapping the Missouri Underground: The MSS from 1956 to Present

Presenter: Daniel Lamping (Sec. Ed. History, Senior)

Advisor/Mentor: Peter Acsay, Ph.D.

Missouri currently has nearly 6,000 caves recorded throughout the state. Many of these caves have been located, explored, surveyed, and studied by a wide variety of groups and individuals. The driving force behind the widespread collection and maintenance of cave data in Missouri has been the Missouri Speleological Survey (MSS). Founded in 1956 under a handshake agreement with the Missouri Geological Survey (now DNR/GSRAD), the MSS is a private volunteer organization focused on the locating, mapping, and study of caves in Missouri. For nearly 50 years the MSS has worked with various state, federal, and private agencies and organizations to collect information about caves in Missouri and to promote speleology and cave conservation throughout the state. The product of this work has been the creation of one of the largest cave databases in the country, including several thousand cave maps which are used by various researchers, agencies, professionals, and cavers. The scope of my research is to investigate the history of the MSS through the use of primary sources to gain a better understanding of what can be achieved by such a diverse consortium of private and public contributors.

Northern Dreams

Presenter: Jana Loftis (Sec. Ed. History, Senior)

Advisor/Mentor: Peter Acsay, Ph.D.

On July 2, 1917, white mobs sought revenge upon the blacks of East St. Louis. They sought revenge for hard times, for frustrations, and for ignorance, killing at least 9 whites and 39 African Americans. In addition to the loss of lives, this riot left thousands of other African Americans sifting through the ashes, looking for any sign of salvageable belongings as over three hundred buildings were destroyed and a community was torn apart. This presentation will examine the causing factors of the East St. Louis Race Riot of 1917. Using both primary and secondary sources, this presentation will highlight how the media, the Great Migration, railroads, political and judicial corruption, political propaganda, labor unions, and racial tension played a role in the massacre.

It Was Our War, Too: the Women's Army Corps at Jefferson Barracks during World War II

Presenter: Kerri Peroutka (History, Senior)

Advisor/Mentor: Peter Acsay, Ph.D.

Prior to World War II, women did not serve in our country's armed forces; however, female civilians worked under Army contracts as volunteers and nurses. These women did not reap the benefits of the military. For example, while serving overseas, they had to obtain food and shelter on their own. Also, these women did not receive medical care, legal protection, disability benefits, or pensions that were available to the United States military veterans. In 1941, congresswoman Edith Nourse Rogers sought to change this by introducing a bill to Congress that would establish a Women's Auxiliary Army Corps. This bill and the subsequent Bill in 1943 that established the Women's Army Corps introduced to the nation a different set of soldiers: the woman soldier. On April 18, 1943, the 152nd WAAC Post HQ CO, AAF, later re-designated the 724th WAC Post HQ CO, AAF arrived at Jefferson Barracks, in St. Louis, Missouri. This presentation will focus on this group of women and their time of service at Jefferson Barracks from April 1943 to March 1944. An examination will be done of how their roles in St. Louis played into the larger national role in WWII and the lasting effects these pioneering women have on today's military.

Immigration in St. Louis

Presenter: Clint Schneider (Sec. Ed. History, Senior)

Advisor/Mentor: Peter Acsay, Ph.D.

This project discusses foreign immigration to the city of St. Louis during the period of 1850-1920. Through research of immigrant census data, it was discovered that inhabitants of Ireland and Germany were the first and largest groups to immigrate to St. Louis. Then, in the early twentieth century, St. Louis, though still having large numbers of Irish and German immigrants, experienced a shift in immigration of individuals from eastern and southern Europe. Through this information and various sources that explore the impact of immigrants on the city of St. Louis, this project will attempt to demonstrate the changes that the city of St. Louis underwent, focusing on the development of immigrant churches that promoted the use of their native languages. Furthermore, the development of organizations that assisted immigrants, as well as the development of parochial schools made specifically for immigrants, and accommodation made by public schools for the increasing foreign population will be explored.

Physics

Are *Daphnia* Turning Angles Selected for Survival?

Presenter: Ricardo Jorge Altino Garcia (Physics, Junior)

Advisor/Mentor: Frank Moss, Ph.D.

Daphnia are aquatic creatures that mostly drift with the current, but in still water while feeding, they wander about in a confined location. They swim in a sequence of discrete hops, mainly confining themselves to the horizontal planes. The hops are motivated by beats of a pair of swimming appendages located near the head. Each hop is followed by a directional change represented by a turn through some angle. It was observed that the mean turning angle of foraging *Daphnia* are similar across species, suggesting that the mean turning angles are selected for survival. Preliminary data of two species in this research will be presented.

Online Laboratories: Electromagnetism Through the Ether(net)

Presenter: Dion A. Mauer (Physics, Junior)

Advisor/Mentor: Mary Jane Kernan, Ph.D.

The Lab@Home Project is designed to enable students to have home access to a typical electromagnetism lab environment. This lab environment, previously only available to students through the use of costly lab equipment, is in the process of being made available at minimum cost through the use of the Internet, web-based course content, and the Lab@Home box. Via the Lab@Home website, the student has access to a complete electromagnetism laboratory course and laboratory manual. Color-coded hyperlinks provide access to a series of nested help menus that replace the classroom help previously only available in person with the assistance of a Lab Instructor. These nested hyperlinks allow the student to work at his or her own pace by providing the freedom to seek help when it is needed or forego help when it is not. Furthermore, the nested hyperlinks offer a unique way of providing students the ability to further research many aspects of electromagnetism by enabling students to study, research, and learn more about any topic he or she might wish to simply by clicking links nested in the web-based course material. Additionally, included in the Lab@Home box are a power supply, a function generator, an oscilloscope, and a multimeter for measuring voltage, current, and resistance. When connected to a PC, the student has everything necessary to perform and complete lab assignments as well as the resources to further enrich his or her fundamental understanding of electromagnetism.

Implications of Quantum Well Asymmetry for Semiconductor Laser Gain

Presenter: Gordon Stangler (Physics)

Advisor/Mentor: Mary Leopold, Ph.D.

A theoretical study of the carrier wavefunctions in an asymmetric AlGaAs/GaAs single quantum well structure is presented. The effect of asymmetry strength on the overlap integral for the $n=1$ and $n=2$ electron to heavy hole transitions is investigated. Implications for the design of asymmetric single quantum well lasers are discussed.

Psychology

Effect of Prior Interpersonal Trauma on Post-Traumatic Stress Disorder Severity in Recently Victimized Women

Presenter: Kaitlyn Powers (Psychology, Senior)

Advisor/Mentor: Tara E. Galovski, Ph.D.

Previous research has found that prior trauma is a risk factor in the development of post-traumatic stress disorder. The goal of the current study is to investigate the effects of prior interpersonal trauma, such as sexual or physical assault, on post-traumatic stress severity. Approximately two hundred women were assessed for post-traumatic stress symptomatology following a physical or sexual assault. The results suggest prior interpersonal trauma leads to greater post-traumatic stress disorder severity.

Social Interaction as a Function of Rated Attractiveness and Perceived Self Attractiveness

Presenters: Erin Block (Psychology, Senior)

Morgan Quernheim (Psychology, Senior)

Advisor/Mentor: Jennifer L. Siciliani-Pride, Ph.D.

The proposed study will investigate the influence of perceived self attractiveness (PSA) and rated attractiveness (RA) on the quantity of social interactions with peers in a collegiate setting. Approximately 300 introductory psychology students from the UM–St. Louis will indicate their PSA level on a scale of 1-10, with 10 indicating a high attractiveness and 1 indicating a low attractiveness. Based on these scores, the data will be split into thirds: the top third will be comprised of data from those indicating high PSA, the middle third will indicate moderate PSA, and the bottom third will indicate low PSA. The quantitative level of interaction with peers will be determined by information provided by the participants (Ps). As Ps turn in completed surveys, each of two expert raters will covertly record RA for each participant. These raters will use the same scale to rate each participant, as well as the same method of splitting these data into high, moderate, and low RA groups. It is hypothesized that Ps with high PSA will report statistically significantly higher levels of social interactions with peers than will Ps with low PSA. Participants with high RA will report statistically significantly higher levels of social interactions with peers than will Ps with low RA.

Anxiety as a Function of Driving Hassles

Presenters: Beth Elliott (Psychology, Junior)

Erica Grus (Psychology, Junior)

Jennifer Marino (Psychology, Senior)

Advisor/Mentor: Jennifer L. Siciliani-Pride, Ph.D.

This research aims to examine how driving hassles, specifically, are related to levels of anxiety. Participants (Ps) will consist of volunteer undergraduate students enrolled in an introductory psychology course at the University of Missouri - St. Louis, recruited during their class period. Packets containing items of a demographic nature, along with a modified version of a Driving-Induced Stress Questionnaire (Rasmussen, Knapp, & Garner, 2000) will be administered to assess the level of driving hassles (DH) participants experienced within the last week. This modified scale contains 33 questions regarding participants' experiences with other drivers, traffic congestion, and locating a parking space. High scores are indicative of high levels of DH. The Beck Anxiety Inventory (BAI; Beck & Steer, 1990) will be administered to measure participants' anxiety levels. Participant data will be divided into a high DH group and a low DH group, based on how each participant's score falls in relation to the mean of the DH scores for all Ps. As high scores on the assessment measuring levels of DH are indicative of high DHs, scores above the mean will make up the high DH group. It is hypothesized that Ps in the high DH group will demonstrate statistically significantly higher anxiety scores than will participants in the low DH group.

Attractiveness as a Function of Menstrual Cycle Phase

Presenters: Andrea Keene (Psychology, Senior)

Aslley Swift (Psychology, Senior)

Advisor/Mentor: Jennifer L. Siciliani-Pride, Ph.D.

This research investigated the effects of menstrual cycle phase on attractiveness ratings. The experimental group consisted of approximately 100 self-identified, fertile women from a general psychology course at the UM-St. Louis. The control group consisted of approximately 50 women using oral contraceptives and approximately 50 men from the same general psychology course. Each participant was asked to fill out a questionnaire gathering demographic and timing of menstrual cycle information. Participants then viewed a slide show of male and female faces taken from an international website used to rate physical appearance. Each participant rated each face on a one to ten scale on attractiveness. It is expected that women in the experimental group (fertile) will statistically significantly rate other women as less attractive than will women in the control group (non-fertile). It is also anticipated that women in the experimental group will statistically significantly rate other men as more attractive during ovulation than they will during menstruation.

Female Body Esteem as a Function of Viewing Underweight and Overweight Female Physiques

Presenters: Caitelin Sappington (Psychology, Junior)

Lisa Schroeter (Psychology, Senior)

Advisor/Mentor: Jennifer Siciliani-Pride, Ph.D.

This project will be investigating the influence of viewing underweight and overweight female physique target stimuli on female participants' (Ps) body-esteem. 150 female undergraduate student volunteers from an introductory psychology course will be randomly assigned to either an underweight or overweight target-viewing group. Ps will then view a flash-photography presentation on a large projector screen of either 20 underweight female physique targets or 20 overweight female physique targets. Each photograph will be displayed for three seconds with half a second blank screen between each photograph. This group of targets will be presented twice, with random reordering of the pictures, for a total presentation duration of 2 minutes and 20 seconds. After the presentation is finished, both groups will complete the Body Esteem Scale (BES). The BES provides a body-esteem score by asking Ps to use a 1- to 5- point Likert scale to self-rate 35 items regarding each Ps' figure, sex appeal, weight concerns, and strength. On this scale, 1 means "I have strong negative feelings" and 5 means "I have strong positive feelings"; thus a low score on this inventory indicates low body-esteem, whereas a high score indicates high body-esteem. It is expected that Ps who view the underweight female physique target stimuli will demonstrate statistically significantly lower body esteem scores than will Ps who view the overweight female physique target stimuli.

Social Work

House Fire Injury and Death among Low-Income Children

Presenters: Kerri McKinney (Social Work, Senior)

Vena Stevens (Social Work, Junior)

Advisors/Mentors: Margaret Sherraden, Ph.D.; Mary Ford

The United States leads industrialized nations in the number of house fire deaths. Fire is a leading cause of death for children under the age of five, especially among the poor. In Missouri, fire and burn injuries are the third leading cause of injury and death among children. House fires are preventable, but injury and death for children continues. This study asks about the incidences and causes of fire injury and death among young children. What are the principal causes of house fire injury and death among young children? What innovations and solutions have reduced the incidence of house fires? The principle method of data collection includes reviewing existing studies, which is supplemented with information from interviews with St. Louis area officials engaged in fire fighting and prevention. Findings emphasize the importance of socioeconomic factors, substandard housing, and lack of childcare and fire prevention education as key factors. In conclusion, potential solutions and ways to further reduce the incidence of house fires and their destructive impacts will be identified.

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