BOOK OF ABSTRACTS
2009 PRESENTATIONS
November 16, 2009
ABOUT THE CAS JUNIOR FACULTY SUMMER RESEARCH AWARD PROGRAM

The College of Arts & Sciences Junior Faculty Summer Research Awards program was initiated in the 2005-2006 academic year to support selected junior faculty as they develop their research and creative projects during their probationary period, a critical time in their careers. The program provides summer salary support to junior faculty for the purpose of advancing their research and creative projects and scholarship. Recipients are selected on a competitive basis.

A total of 54 awards have been made since the program’s inception, with 13, 17, 13 and 11 awards being made in 2006, 2007, 2008, and 2009 respectively.

ACKNOWLEDGMENTS

Sincere thanks are due to members of the College Research & Faculty Development Committee for their diligent work in reviewing the applications and selecting the recipients. We are also indebted to Mrs. Dana Kearns and Mrs. Kelly Powell, the Dean’s office staff who worked meticulously in handling the logistics involved in the application review process, award management, and the setting up of the poster presentation session. Last but not least, our gratitude goes to award recipients and all applicants for making the junior faculty summer research program the success that it is.

PROGRAM

Location: First Floor Lobby, Roark Building (Refreshments served)

1.00 - 1.30 pm    Set up
1.30 - 1.35 pm    Opening remarks, Dr. John Wade, Dean
1.35 - 2.10 pm    Poster session
2.10 - 2.30 pm    Interactions among recipients
2.30 - 3.00 pm    Clearing

FURTHER INFORMATION

For further information please contact:

Dr. Tom Otieno
Associate Dean for Administrative Affairs & Research

E-mail: tom.otieno@eku.edu
Phone: 622-1393
# PRESENTERS AND TITLES

## ARTS & HUMANITIES

<table>
<thead>
<tr>
<th>Abstract Number</th>
<th>Presenter</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Richard Mott</td>
<td>Digitizing Native American Literature for 21st-Century Students: Google Earth as Teaching Tool</td>
</tr>
<tr>
<td>2</td>
<td>Julie Hensley</td>
<td>The Recklessness of Water</td>
</tr>
<tr>
<td>3</td>
<td>Derek Nikitas</td>
<td>Development and Adaptation: The Hidden Elements of the Creative Process</td>
</tr>
</tbody>
</table>

## NATURAL & MATHEMATICAL SCIENCES

<table>
<thead>
<tr>
<th>Number</th>
<th>Presenter</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Nathan Tice</td>
<td>Synthetic Thiophene Derivatives for Solar Energy Capture</td>
</tr>
<tr>
<td>5</td>
<td>Buchang Shi</td>
<td>The Deuterium Tracer Studies the Mechanism of the Synthesis of Hydrocarbons from CO and H₂</td>
</tr>
<tr>
<td>6</td>
<td>Tanea Reed</td>
<td>Development of a Time Course for GCEE Treatment for Traumatic Brain Injury Post Incident: Insight into the Role of Glutathione Elevation as a Potential Therapeutic Strategy for TBI</td>
</tr>
<tr>
<td>7</td>
<td>Laurel A. Morton</td>
<td>The Development of Porphyrin-Ionic Liquid Hybrid Catalytic Systems for Use in The Degradation of Lignocellulosic Biomass</td>
</tr>
<tr>
<td>8</td>
<td>Michelle L. Smith</td>
<td>Repeated Classification Subject to Errors in Process Control</td>
</tr>
</tbody>
</table>

## SOCIAL & BEHAVIORAL SCIENCES

<table>
<thead>
<tr>
<th>Number</th>
<th>Presenter</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Benjamin Z. Freed</td>
<td>Sacred Groves and Special Forests: Rare and Endangered Primates near Human Communities in Madagascar</td>
</tr>
<tr>
<td>10</td>
<td>Theresa M. Nowak</td>
<td>School Readiness for Young Children with Special Needs</td>
</tr>
<tr>
<td>11</td>
<td>Catherine L. Howey</td>
<td>Grave Histories: Female Funerary Monuments Writing Histories of the Reign of Elizabeth I</td>
</tr>
</tbody>
</table>
Digitizing Native American Literature for 21st-Century Students: Google Earth as Teaching Tool

Richard Mott
Department of English & Theatre

This project, which includes an extensive, multimedia, educational tool entitled *WebCeremony*, pursues the application of digital technology to teach literature, or more specifically, Native American literature. Designed as an electronic companion for those reading Leslie Silko’s novel, *Ceremony*, *WebCeremony* takes advantage of digital audio, imagery, and video to contextualize students with the unfamiliar geography, cosmology, spirituality, and cultural customs of the Laguna people.

Exploiting the flexibility and spatial metaphors inherent in geobrowsers like Google Earth and Bing Maps, I demonstrate how using keyhole markup language (kml) to attach digital data to specific geographic points can help students understand the power of landscape in the novel, and its role in the Laguna culture. Moreover, because a hypertext, geospatial environment contextualizes visitors in a manner fundamentally different than the way paper-based media contextualizes the traditional reader, geobrowsers offer the ideal setting for a companion to *Ceremony*: the non-linear, spiderweb-like environment of *WebCeremony* mirrors the structure of the novel, allowing website visitors the same agency of narrative construction that Silko grants her "listener-reader."
The Recklessness of Water

Julie Hensley
Department of English & Theatre

*The Recklessness of Water* is a novel-in-progress chronicling three generations’ coming of age in a tightly knit southern family. This text explores the idea that family secrets can be passed down without ever explicitly being exposed, the idea that we continue to guard family secrets and move carefully around them without ever fully knowing them. In the novel’s current temporal frame, Sylvie Pritchard is vacationing in the Ouachita Mountains of western Arkansas at a lake house which has been in her family for nearly a century. She and her husband have been trying to conceive a child for eight years. To Sylvie, the weeks she has in this secluded location seem like her last chance at motherhood. Her mind keeps returning to the last summer she vacationed in this place, the summer she and her older sister Wren spent here with their newly retired grandparents. That summer, Wren began sneaking out to meet an older local boy, and when Sylvie discovered these nightly absences, she covered for her sister ultimately enabling what, looking back as an adult, she realizes might have been her sister’s rape. Braided into her own account are Sylvie’s (speculative) interpretations of two other narratives. These three narrative threads are braided in such a way that the back-story continually resurfaces in equilibrium with the current temporal frame, reinforcing the metaphoric/emotional interruption generational secrets pose.

In one of the back-story narrative threads (based loosely on my maternal grandparents’ courtship in 1940’s Houston and Galveston, Texas), Georgia St. Clair refuses to marry Byron Stone, her on-again-off-again boyfriend despite his looming deployment. Instead, she plans to spend the summer on Galveston Island. Her mother, an eccentric jazz singer, plays regular gigs at the Balinese Room, and her best friend Lucky Callahan’s family has a summer home near the strand. But following Byron’s departure, Georgia finds herself pregnant. She miscarries before anyone discovers her secret, but she is so consumed by the loss that she finds social activities overwhelming. Much to her father’s dismay, she goes to work manufacturing munitions in a converted bottling company. When Byron is injured and moved to a veteran’s hospital in Hot Springs, Arkansas, Georgia moves there, hoping to nurse him and win him back.
Development and Adaptation: The Hidden Elements of the Creative Process

Derek Nikitas
Department of English & Theatre

We're all aware, on some level, that the novels we take down from bookstore shelves are not the spontaneous, first-draft efforts of the writer's imagination. When we go to the theater, we also know that the film on the screen began its journey as a screenplay, maybe even a screenplay adapted from an earlier work, such as a novel, play, or comic strip.

The purpose of my project is to make available those aspects of storytelling that an author undertakes even before the first draft is written, and, similarly, those aspects of the creative process involved in adaptation from one medium to another. In short, I seek to expose the hidden elements of the creative process that are so rarely discussed or examined—the synopsis and the screenplay. Of course, my examination is by nature quite subjective and personal, since my own creative process is what I'm putting on display.

One half of my project records the development of my third novel, *The Sleepwalkers*, a supernatural thriller about the fictional contemporary ramifications of the occult rivalry between famed poet W.B. Yeats and infamous provocateur Aleister Crowley, as played out by underground occultists working within a private New England college. My process, undertaken over the summer of 2009 and currently ongoing, includes researching the biography and writings of Yeats and Crowley, researching the occult in general, journaling my brainstorming ideas, and constructing a twenty page, chapter-by-chapter synopsis of the entire proposed novel. The synopsis itself is a dense document, refined over many revisions, and serves as a blueprint for the eventual book. This half of the project culminates in a fifty page draft of the beginning of the novel.

The second half of my project records my summer efforts to adapt my second novel, *The Long Division*, into a screenplay. The screenplay is complete and currently making its rounds with a Hollywood agent, but it began as an extreme exercise in "negative space," a continuous process of cutting the three hundred page novel down to what I envision are its essential elements, deleting and condensing scenes and characters, until I had a one hundred and forty page manuscript. Then, I gradually cut forty pages from the manuscript to reach a feature length. The most difficult and interesting aspect of the project involved transitioning the "internal" aspects of the characters in the novel into external cues, since the medium of film demands that everything be shown or implied instead of told.
Synthetic Thiophene Derivatives for Solar Energy Capture

Nathan Tice
Department of Chemistry

Thiophenes and their derivatives have long been of interest for use in advanced electronic applications. Due to their unique properties including environmental stability, high processibility, and low production cost, thiophene-based electronic materials are an attractive alternative to conventional inorganic semiconductors. The growing interest and demand for alternative energy and next generation electronic devices has led to the incorporation of thiophene materials into field-effect transistors (FETs), organic light-emitting diodes (OLEDs), and organic photovoltaic (OPV) cells. Functionalizing the thiophene monomer with fused rings at the 3- and 4-position, as in the case of polybenzo[c]thiophene, has been found to not only increase the polymer’s conductivity, but its environmental stability and solubility. Thus, developing low cost routes to fused-ring thiophenes represent a key step into the commercialization of these heterocycles. While thiophene derivatives have already shown great promise in both the materials and energy sector, this still represents a rich area of unexplored investigation. Using low cost, facile synthetic routes, novel thiophene derivatives can be isolated with the potential for use in solar cell technology. For example, the 5,6-fused thiophene, 5,7-dimethylthieno[3,4-d]pyridazine, can be formed in high yield using a straightforward, 4-step route. This thienopyridazine displays high solubility in common organic solvents and good solution and air stability. This poster will discuss the application of organic conducting materials in electronics, the role of thiophenes in alternative energy applications, and the synthesis and characterization of various fused-ring thiophene derivatives.
The Deuterium Tracer Studies the Mechanism of the Synthesis of Hydrocarbons from CO and H2

Buchang Shi
Department of Chemistry

This project addresses the mechanism of carbon-carbon bond formation in Fischer-Tropsch (FT) synthesis, a catalytic reaction that converts CO and H2 to liquid fuels. While progress in studying the mechanism of FT reaction has been made over the years by 14C and 13C tracer studies and density function theory calculations, two fundamental questions still remain to be answered: 1) which step is rate-determining step of this reaction? 2) What is the possible surface chemical structure of the growing chains? This project will address these two problems through deuterium tracer studies. By measuring the CO conversion, the H2/D2 switching experiments in a cobalt catalyzed FT reaction unambiguously shows that there is an inverse isotope effect in FT reaction, which suggests that the steps determining the rate of the reaction also show an inverse isotope effect. The deuterium enrichment with molecular size obtained in H2/D2 competition experiments suggests that the inverse isotope effect is originated from each step of the propagations. Since the inverse isotope effect is the result of rehybridization of a sp2 carbon to a sp3 carbon, the possible surface C2 species during FT reaction was assumed to be ethylidene. By utilizing C2 compounds labeled with deuterium atoms as probes in a iron catalyzed FT reaction, the experimental evidences for the structure of C2 surface species was provided. Based on these results, the alkylidene mechanism for FT reaction is proposed, which can explain experimental facts observed so far.

Development of a Time Course for GCEE Treatment for Traumatic Brain Injury Post Incident: Insight into the Role of Glutathione Elevation as a Potential Therapeutic Strategy for TBI

Tanea Reed
Department of Chemistry

Traumatic brain injury (TBI) occurs suddenly and has damaging effects to the brain that are dependent on the severity of insult. Symptoms can be mild, moderate, or severe. Mild symptoms can include but are not limited to confusion, lightheadedness, double vision, personality changes and memory impairment. Moderate and severe TBI cases show the same symptoms but worsened, slurred speech, seizures, nausea, unresponsiveness, and possible death. Worldwide, TBI occurs in 10 million people annually, with approximately 1.4 million cases in the United States alone. The outcome can range from complete patient recovery to permanent neurological dysfunction. Oxidative damage is associated with traumatic brain injury through reactive oxygen/nitrogen species production. There is no known cure for traumatic brain injury; however immediate medical care after injury is most advantageous for patient recovery. Glutathione (γ-Glu-Cys-Gly) is a powerful antioxidant found in brain. Gamma glutamylcysteine ethyl ester (GCEE) is an ethyl ester moiety of gamma glutamylcysteine that upregulates glutathione production. Since TBI is a sudden injury, pretreatment is hard to establish, therefore post treatment is a better mode of benefit. This study is one of the first to investigate a potential time course for GSH-based therapeutic treatment post TBI injury. Results from this experiment will give a greater insight into developing new post therapeutic strategies for treatment of traumatic brain injury in hopes to reduce brain damage via oxidative stress in TBI.
The Development of Porphyrin-Ionic Liquid Hybrid Catalytic Systems for Use in The Degradation of Lignocellulosic Biomass

Laurel A. Morton
Department of Chemistry

A great deal of interest and effort is currently focused on the production of fuel ethanol from the fermentation of sugars derived from corn, sugar cane, and switch grass. A significant limitation for this alternative fuel is that it utilizes only a small portion of the total harvested material present in the plant matter. In order to fully utilize these biomass resources we must overcome the challenges that exist in the processing of lignocellulosic components of the harvested plant material. Lignocellulosic materials can be broken down into bioproducts and biofuel feedstocks through enzymatic degradation. However, these enzymes have limited function under the conditions required to dissolve lignin and cellulose. Iron porphyrins have been shown to mimic the function of these enzymes in a wider range of conditions. In this study we will synthesize biomimetic iron porphyrin complexes and study their reactivity using a range of ionic liquid solvents. Ionic liquids are gaining wide recognition as environmentally friendly solvents for various biochemical and chemical reactions. Additionally, they recently have been shown to dissolve both lignin and cellulose at standard temperature and pressure. Combining the ability of the ionic liquid solvent to dissolve lignin with the reactivity of the metalloporphyrin complex could overcome many of the challenges to lignin utilization. Current work in my group focuses on the synthesis and characterization of novel porphyrin catalysts and studying their catalytic activity towards lignocellulosics. These novel metalloporphyrin/ionic liquid complexes would function as both catalyst and solvent and therefore have the potential to significantly improve the efficient production of bioproducts from lignin.

Repeated Classification Subject to Errors in Process Control

Michelle L. Smith
Department of Mathematics & Statistics

A number of authors have considered the procedure of on-line process control in which every $i^{th}$ item produced is inspected. The process continues if the inspected item conforms to specifications. If the inspected item fails to conform, then the process is stopped, examined, and adjusted as necessary. More recently, a modification has been considered which has incorporated the possibility of misclassifying items when they are inspected and different schemes have been suggested for dealing with this. The item which is inspected is typically now subjected to repeated independent classifications which may classify the item differently. Then, from these repeated classifications, some rule is used to determine whether the item should be ultimately judged as conforming or nonconforming. In this paper, we review this literature and propose and study new schemes for ultimately judging the item.
Sacred Groves And Special Forests: Rare and Endangered Primates near Human Communities in Madagascar

Benjamin Z. Freed
Department of Anthropology, Sociology & Social Work

Although local people are often considered the greatest threat to primate populations, some primate species prefer to live near people in sacred groves, traditional lands in which species are protected by local taboos, history, and spiritual traditions. Primate populations can use these sacred groves as refuges from nearby deforestation. Yet many of the behavioral aspects of these populations remain unknown. To what extent do these primates behave any differently from populations that inhabit non-sacred zones?

I conducted a six-week study of the habitat selection of crowned lemurs (Eulemur coronatus) and Sanford’s lemurs (Eulemur sanfordi) in remote forests in northern Madagascar. The main goals of this study were to identify future field sites for long-term behavioral research, and to assess the impact of local human traditions on the distribution of the lemurs. I compared the habitat structure, lemur distribution, and conservation threats in three types of forest: two neighboring sacred, but locally protected forests; twelve traditionally sacred, but disturbed forests; and four nonsacred, isolated forests. In each forest I counted the number of lemur groups, collected initial behavioral notes, observed the most common tree species, and observed evidence of human use of the forest. Several trends have emerged from this study. First, lemur populations are severely threatened throughout the survey region, but especially in those areas where local people abandon local traditions that protect forest cover and primates. The greatest threats have been from logging of valued rosewood and other hardwoods, and from subsequent tavy (slash-and-burn) rice agriculture. I found little evidence of hunting in this region. Secondly, only lemurs living in those forests that are both devoid of prized timber and that are protected by local traditions have escaped the direct effects of deforestation and hunting. Finally, in each sacred forest (including nearly all sacred, but disturbed forests), lemurs appeared readily habituated to local people, and could be easily approached. In many cases, both species formed mixed-species associations, and were observed feeding or foraging together, just as they do in larger forests. Unlike more recent reports from elsewhere in the geographic range of these species, I found no evidence of the trading of lemurs as bushmeat. In my study region, local human traditions offer these species some hope for their conservation.
Grave Histories: Female Funerary Monuments Writing Histories of the Reign of Elizabeth I

Catherine L. Howey
Department of History

This project is part of a larger book manuscript which examines the various ways in which women at the court of Elizabeth I helped construct the queen’s royal image and shaped the ways in which political power was wielded at court. Most of the histories and biographies of the queen and her reign portray Elizabeth as the lone female figure at court struggling to maintain her power and implement her policies by either working with or against her male officials and courtiers. My work, however, joins the small but growing body of scholarship that examines how the women who served Elizabeth I in her privy chamber—the two to three small rooms used by the monarch for private repose—exercised political power and agency at the Elizabethan court. This particular chapter argues that women were capable of considerable political agency at court and that their tombs were used to write historical accounts of Elizabeth’s reign—accounts that historians have hitherto ignored.

Tombs are complex historical sources and are best studied in their actual location. Photographs often blur or miss important sculptural details. It is also vital to see where the tomb fits in the whole church, and not studied as an isolated entity. Many tombs include effigies of the deceased. It is imperative to deconstruct the message(s) being transmitted by the effigy in conjunction with the tomb’s epitaph and the general design of the monument. Often an effigy is dressed to give visual clues about the deceased and his or her family. Indeed, by examining the tombs of court women, it becomes clear that women’s effigies, memories, and activities were manipulated, excluded, or included to create histories of Elizabeth’s reign. Most of the histories told by the tombs’ epitaphs and sculptures present highly edited histories of an individual and his or her family’s connection to the queen and their role in England’s politics. Some of these personal histories appropriated the image of Elizabeth I as a model Protestant ruler, but other women and their families use their funerary monuments as sites to challenge England’s glowing memory of Elizabeth I. Either way, the choice to glorify or critique Elizabeth, to include or exclude a female relative’s court service, was a deliberate one made to either attach the family’s importance to that of the Crown or to define the family’s importance as independent from the monarchy. In both instances the tomb monuments of Elizabethan court women demonstrate once more how the image and power of the queen was intertwined with the image and power of her serving women.
School Readiness for Young Children with Special Needs

Theresa M. Nowak
Department of Psychology

Early adjustment is considered a priority for future school success by many researchers who propose that most learning and behavior patterns are established by the third grade (Pianta & Steinberg, 1992). Adjustment to school, however, may be more challenging for some children than others due to their developmental status. For example, kindergarten children who had auditory and visual memory disturbances exhibited greater learning difficulties in school (Taylor, Anselmo, Foreman, Schatschneider, Angelopoulos, 2000). To add to these challenges, throughout the early childhood years children with disabilities and their families experience myriad transitions between various agencies, settings, and providers. These transitions can be difficult for children and their families due to a lack of continuity in program philosophies and practices, and an absence of a system to ease the transition process. Interestingly, Entwisle and Alexander (1998) point out that transitions, particularly transitions to schools, have broad implications for children’s success. Although significant research on early childhood transition practices exists, clear gaps remain. This report extends the knowledge base on transition practices that increase school success and result in positive outcomes for young children with disabilities and their families. A multi-state longitudinal research project investigating child, family, and program factors was completed and, with such a large database, data continue to be analyzed and disseminated. Working collaboratively with members of the National Early Childhood Transition Center (NECTC), the first technical report describes the procedures of the research studies, followed by reports on studies 1 through 5. The first technical report is complete and the remaining reports are in varying levels of draft form.