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 69 awards have been made since the program’s inception, with 13, 17, 13, 11 and 15 awards being made in 2006, 2007, 2008, 2009 and 2010 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 Ms. Roxann Sumner, 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

Date: November 15, 2010
Location: First Floor Lobby, Roark Building (Refreshments served)

8.30 - 9.00 am  Set up
9.00 - 9.05 am  Opening remarks, Dr. John Wade, Dean
9.05 - 9.40 am  Poster session
9.40 - 10.00 am Interactions among recipients
10.00 - 10.30 am Clearing

FURTHER INFORMATION

For further information please contact:

Dr. Tom Otieno
Associate Dean for Administrative Affairs & Research

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ABSTRACTS

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Middleland: On The Edge Of Indifference

Melissa Vandenberg
Department of Art & Design

Landscape, as a place and concept, has long been an inspiration for artists. It is as much an idea as it is a painting, place or view. Landscape has evolved into a manufactured element of our existence with less untouched geographies than any other time in history. With that acknowledgment it becomes our responsibility to evaluate the way in which we touch and, in turn, affect our landscape. Out of this evolves Middleland: On The Edge Of Indifference.

Middleland is an extension of my current studio practice as an artist, which looks towards the political landscape of the United States. This project physically explores a series of Border States in the central US along with the accompanying landscape for American identity. These are not your typical Border States; semantically they are an amalgamation of the Heartland, the Midwest, the Bible Belt, south of the Rust Belt and east of the Corn Belt, all the while flanking the Mason-Dixon Divide. The area provides a rich yet fractured history as ideologies are continually challenged from the surrounding North and South. Every territory has a dialect of visual adornment, exemplifying a particular region’s prevailing belief system. This distinctiveness is reflected in the landscape, monuments and memorials born of the core values and communities responsible for erecting them. Middleland documents this region’s distinctive identity through a comprehensive series of photos, drawings, paintings and sculptures.

The Middleland itinerary travels through Kentucky, West Virginia, Virginia, North Carolina, Tennessee, Arkansas, Oklahoma, Missouri, Kansas, Illinois and Indiana. The route favors state and local roads, avoiding freeways and other generic thoroughfares. As a result the towns travelled through were less populated and rural. As an artist exploring American iconography and nationalism, the objective is the discovery of regional clues to serve as subject within the resulting works of art.
My project focuses on two separate goals. The first of which revolved around my attendance at VSA art’s International Festival in Washington DC. In September 2009 I was notified that my painting *Seam* would be part of “Revealing Culture”, an international group art exhibit held in the Smithsonian Institution’s International gallery in Washington DC. This exhibit was in conjunction with the VSA arts International Arts Festival. The festival brought together artists, educators, researchers, and policy makers with disabilities from around the world for a multicultural celebration of the arts and arts education. The second goal for this project is based around my personal research involving botanical images. During the week directly after the VSA art’s International Festival I studied, observed, drew and photographed plant life at the United States Botanical Garden in Washington DC. I have since transferred these drawings and photographs into a new group of paintings.

At the basis of my recent paintings lie my fears associated with being born devoid of a right hand. Painting my hand, my prosthetic and personal imagery associated with my discomfort of being different, forces me to work with an uncomfortable subject. In the paintings I create, I transform these personal descriptions of hands and prosthetics into my own visual vocabulary that includes an assortment of botanical representations in various states of definition. In my paintings, plants act as visual placeholders for hands, prosthetics, and my birth defect.
Unique Forms of Continuity and Space: The Search for New Form and Space in *The Sun Also Rises*

Jonathan Austad
Department of Foreign Languages & Humanities

This paper will examine the ideas and artistic elements of Henri Bergson, F.T. Marinetti, and Umberto Boccioni to establish the fundamental elements of Futurism and compare these aesthetical values to Hemingway’s *The Sun Also Rises*. Futurists seek to destroy imitative art to create new space and form. Hemingway echoes these patterns in *The Sun Also Rises*, distorting human forms through physical and emotional scars, estrangement of human relationships, and irrelevancy of tradition. This paper will examine the fragmented lives of Jake, Cohn, and Brett and how these characters have become emotionally frustrated, psychologically wounded, or physically injured by the false hope of past ideals. After deteriorating the form of the characters, he then fragments their space to further separate from past aesthetic values and find a new direction for literature. With nothing left from the past to embrace in their tattered lives, the characters find new values of the modern world such as bullfighting, drinking, fishing, and boxing. Hemingway displays fragmentary images of Parisian nightlife and Spanish festivals to segment space and provide distorted and fragmentary sketches of the modern world to promote a new aesthetic vision of space and form, associating Hemingway’s *The Sun Also Rises* to the objectives of Futurism.
My project is conceived as a comparative analysis and interdisciplinary case study of the character and scenario introduced in Voltaire’s 1736 tragedy, *Alzire, ou les Américains*, adapted by Verdi for opera in the 19th century, and adapted to film by Thomas Koerfer in 1978. The research that I conducted this summer included a reading of the play text, a sketch of my own interpretation, a review of the play’s reception and its influence on other 18th century writers and playwrights, a search and review of the critical literature, screening and consideration of Koerfer’s film, and the acquisition and screening of a production DVD of the Verdi opera by the Theater St Gallen in Switzerland. I am also preparing an English translation of the opera libretto.

The argument is structured as an expository critique. The introduction, taking a cue from Raymonde Morizot (*Voltaire dérange toujours*), notes the way in which Voltaire remains ever provocative. *Alzire* is for many reasons a vexed character, and *Alzire* a vexed play, a tragedy of the conquest whose discussion of ‘barbarism’ and ‘civilization’ primarily criticizes but also re-inscribes a variety of European colonial attitudes and prejudices. The body of the paper discusses Voltaire’s drama in its early French Enlightenment context, as well as its reception and its influence in the 18th century (translations, parodies, imitations). Attention is paid to the primary lines of criticism that have developed around the play, including much disputed aesthetic as well as ideological terrain. My own interpretation pursues three sets of inter-related themes and interests: 1. Anti-colonialism, Self-critique and Appropriation; 2. Authenticity, Love and Society; and 3. Religion, Nobility and the Logic of Forgiveness. Next, I analyze two specific adaptations: 1. Verdi’s opera, *Alzira*, as produced by the Theater St. Gallen in 2010; and 2. Thomas Koerfer’s film, *Alzire, oder die neue Kontinent*. From here, I consider the continuing political and social resonance of the *Alzire* scenario, highlighting relevant contemporary conflicts such as, especially, the continuing indigenous (primarily Peruvian) resistance to state, corporate and capital extractive industry projects on traditional lands, projects which may be seen as variations on the all too familiar theme of colonial efforts at conquest and possession (or coercion and co-option). Finally, I offer a conclusion that clarifies the enduring value of Voltaire’s brand of drama, arguing for a revival of interest in the Enlightenment approach to tragedy, too often under-appreciated, dismissed or overlooked.
Integrity seems to involve, among other things, standing by one’s own convictions, even in the face of adversity, temptation, and other obstacles. On the other hand, it seems counterintuitive to suggest that standing by any conviction is sufficient to imbue a person’s life with integrity. Some people do morally terrible things on the strength of their convictions. But because integrity is often regarded not only as a personal accomplishment but also a moral achievement, it seems incorrect (or forced) to ascribe integrity to such persons.

I suggest that we can resolve these difficulties by undertaking an analysis of the notion of being steadfast, distinguishing morally responsible forms of steadfastness from morally corrupt forms (such as merely blind, dogmatic, fanatical, and unreflective commitment). This analysis proceeds by identifying other significant marks of integrity—such as judiciousness and consistency—which are often as essential to integrity as standing by one’s convictions.

The result of this, however, is that integrity turns out to be a vastly more complex and flexible concept than one could hope to specify in terms of necessary and sufficient conditions. Standing by one’s convictions seems, in most cases, a necessary mark of integrity, and yet exceptions can arise. Similarly, the elimination of inner struggle seems essential on some accounts of integrity—which see integrity as a matter of possessing an “undivided self”—yet some people who cannot eliminate inner conflict may still confront such difficulties in a way that exhibits integrity. This is why it seems more appropriate to speak above of marks of integrity, rather than conditions. Integrity appears not to be something that can be pursued directly, but is rather a characteristic properly ascribed to individuals who successfully cultivate and manifest other, more fundamental virtues, such as courage, honesty, and good judgment (viz. the ability to reason and reflect in a sensitive and informed manner about practical and moral situations). At least, one cannot maintain integrity merely by “sticking to one’s guns.”
Detection of Freshwater Mussels Using Environmental DNA from Water Samples

David M. Hayes
Department of Biological Sciences

The southeastern United States is home to the world’s largest diversity of freshwater mussels, however, they are also the most imperiled group in North America with up to 70% considered endangered or threatened. Surveys for mussels involve tactile searches using SCUBA or snorkeling methods however, small and rare mussel species are often missed during routine sampling and handling of the animals has been shown to alter growth and reproduction. Recently, molecular methods involving the use of environmental DNA (eDNA) have been successfully used to indirectly detect the presence invasive species (Asian carp and bullfrog) in filtered water samples. This research explores the feasibility of using eDNA to detect mussel species with the goal of utilizing it as a method for remote detection of rare and endangered species. To assess eDNA use in mussel detection, we designed a small laboratory experiment using contained aquaria and live mussels (*Amblema plicata*). Mussels were removed from the water after one week and the water was filtered through a glass fiber filter. DNA was then extracted from the filter and will be amplified using species-specific primers to determine if the target species is present in the water sample. We are currently in the process of optimizing these species-specific primers using direct tissue DNA extractions.
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Eastern Kentucky University Plant Diversity and Conservation Laboratory

**Tyler Smith**  
Department of Biological Sciences

My research is motivated by a need to understand the connection between taxonomic and ecological diversity. Most species-rich systems include groups of morphologically cryptic species. These species differ in very subtle physical characteristics. In many cases, they are demonstrably distinct genetically, but ecologists remain divided on whether they fill different ecological roles within the community. Effective conservation and management of an ecological community depends on understanding the interactions among its member species, so this theoretical issue has broad practical ramifications. In my first year at EKU I have initiated three separate projects to investigate the ecological value of species diversity. The first is an evaluation of the taxonomic status of the endangered plant *Trillium pusillum*. I am using a combination of molecular genetic and morphological techniques to determine whether this wildflower is a single wide-ranging and species of diverse habitats, or two or more species with very restricted ecological requirements. My second project is part of a 50 year investigation into community dynamics in an old-growth forest in Eastern Kentucky. I will be using field data to determine long-term changes in forest stand characteristics, and to evaluate interactions between the tree community and the herbaceous species of the forest floor. My third project is an evaluation of the taxonomic status of *Scleria*, a group of poorly understood sedges. It is currently unclear how many species of *Scleria* are present in eastern North America, and how they differ in their ecological relationships.

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Exploring the Use of ALEKS in Diagnosing and Remediating Students in Mathematics

**Cheryll E. Crowe**  
Department of Mathematics & Statistics

Assessment and LEarning in Knowledge Spaces (ALEKS) is a web-based program used to diagnose and remediate students in mathematics. Originating with research at New York University and the University of California, Irvine through a grant from the National Science Foundation, ALEKS now includes over fifty subjects and courses for K-12 and higher education. There exists great potential for use of ALEKS in public schools throughout the EKU service region as well as undergraduate and graduate courses at the university.

This project explored the use of ALEKS in two settings: a regional school district with students in grades 3-8 and a graduate mathematics education class at the university level. A survey was given to each participant exploring the advantages and disadvantages of the software as well as student and teacher perspectives of the use of this technology to foster mathematical understanding. The results of this project will be used to determine the viability of expanding the ALEKS program to additional schools in the region and other mathematics education courses at EKU.
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Evaluation of the Inquiry Style Curriculum: Evidence from Retrospective Data

Jing Wang
Department of Physics & Astronomy

In the past four years, the Department of Physics and Astronomy at Eastern Kentucky University (EKU) has incorporated the inquiry teaching style into the curriculum to replace the traditional lecture/laboratory course format in both the algebra-based and the calculus-based introductory physics sequences. The courses use an integrated approach, transitioning seamlessly between inquiry-style laboratory activities, lectures and problem-solving sessions. This study evaluates the curriculum development from a quantitative perspective: Does inquiry teaching produce positive results at EKU? We developed the analysis based on data accumulated in the past four years: the course enrollment data, course grade data and research based assessment data. The results strongly suggest that inquiry teaching produces positive results in both course enrollment and student learning.

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Synthesis and Characterization of Novel Materials for Application in Thermoelectric Technology

Xiunu Lin
Department of Physics & Astronomy

Recently, increased awareness in energy consumption and environmental conservation has aroused a great deal of enthusiasm and motivation for the development of thermoelectric (TE) technology. The core of this technology lies in the TE materials which can generate electrical power when a temperature difference is created across the materials. So far, this technology has found its application in many fields such as space missions, laboratory equipment, and medical technology. However, further development of this technology for industrial applications is constrained by the low efficiency in thermoelectric materials. Thus, a critical step in the development of TE technology is to improve the intrinsic energy-conversion efficiency of thermoelectric materials. Both Antifluorite (Mg$_2$A, A=Si, Ge) and skutterudite (CoSb$_3$) have long been considered as possible candidates for this application. In this poster, we are going to present our study on the effect of Tin (Sn) doping in Mg$_2$Si$_{1-y}$Sb$_y$ and ytterbium (Yb) / Germanium (Ge) doping in CoSb$_3$ in these materials’ thermoelectric properties. In addition, we are also going to present the design and construction of a thermoelectric-properties-measuring probe. This probe will be used as a primary measuring system for our future research at EKU. When completed, it will be coupled with a closed cycle refrigerator to measure material’s resistivity, Seebeck coefficient, and thermal conductivity for temperature ranging from 15K to 350K.
Sex Dependent Regulation of miRNA in Cardiac Remodeling

Rebekah L. Waikel
Department of Biological Sciences

Approximately 80 million Americans have hypertension. Prolonged hypertension eventually leads to the development of left ventricular hypertrophy (LVH), which is a significant risk factor for cardiovascular death and heart failure (HF). Within the last few years research has shown that microRNAs (miRNAs) are highly regulated during cardiac hypertrophy and are capable of regulating cardiac remodeling. To date no comparison of sex dependent cardiac miRNAs have been described. Sex specific differences in the response of the heart to stressors such as hypertension have been well documented. Estrogen has been shown to play a protective role in this regard in both humans and rodent models. We have demonstrated in a pilot study that selected miRNAs are differentially regulated in male and female mice at baseline and in as a consequence of stimulation of cardiac hypertrophy. An understanding of sex specific regulation of miRNAs in the heart could have a far-reaching impact on the diagnosis and treatment of heart disease. The central hypothesis of this work is that male/female differences in susceptibility to adverse cardiac structural remodeling are due to estrogen mediated regulation of miRNAs. To determine sex specific regulation of miRNAs during cardiac hypertrophy we compared levels of miRNAs in a surgical mouse model for cardiac hypertrophy. Male and female C57BL6 mice underwent surgery to band their aortas, transaortic constriction. Banding results in pressure overload, which leads to left ventricle hypertrophy. Both at 1 week and 5 weeks post surgery hearts were weighed and total RNA was extracted. Five weeks post surgery female hearts exhibited a lesser degree of hypertrophy in response to pressure overload. Interestingly, the level of hypertrophy is equal, if not greater in the female mice, 1 week post banding surgery. Real-time PCR Analysis has revealed sex specific patterns of miRNA expression in left ventricular hypertrophy. Ultimately, the goal of this research is to improve our understanding of the sex specific regulation and downstream targets of miRNAs during cardiomyocyte hypertrophy to improve diagnosis and treatment of LVH.
Graffiti is a common phenomenon in ancient Egypt, usually written by elite scribes and priests at significant religious sites to record their presence. Examples occur in temples, on cliff walls, and in the royal tombs of the Valley of the Kings. Many of the tombs of the kings of Egypt’s Twentieth Dynasty (ca. 1186-1069 B.C.) were accessible to visitors during the Greco-Roman period, a thousand years after their construction, and a number of those visitors scratched their names into the plaster walls of these tombs in a form of ancient Egyptian known as “Demotic.” Although many visitors just wrote their names, some left a short prayer, “May my good name remain here before the god forever,” suggesting that they saw the tombs as significant religious sites with which they wanted to associate themselves for eternity.

The Valley of the Kings Demotic Graffiti Project was initiated in the summer of 2005, when Eugene Cruz-Uribe (Department of History at Northern Arizona University) and Stephen Vinson (Department of Near Eastern Languages and Cultures at the Indiana University - Bloomington) carried out a three-week preliminary survey to discern the feasibility of a project recording all of the Demotic graffiti in the Valley of the Kings. This initial exploration convinced them of the
value of such a survey, and they invited me to join the project in January of 2006. We carried out
two six-week field seasons in the summers of 2006 and 2007, discovering and photographing
hundreds of graffiti in eight tombs in the valley. We returned for a final season this past June and
July in order to re-photograph and re-examine several particularly difficult examples. The
catalogue of graffiti is now complete, and we are ready to analyze the material in depth and write
the narrative section of a co-authored monograph.

Demotic is a cursive script used to write "vernacular" Egyptian from c. 650 BCE onward; the
approximately 250 graffiti under analysis date from the Ptolemaic to the mid-Roman periods, c.
323 BCE-200 CE. As a result, the Demotic graffiti are evidence of the continuation of local
culture under Greek and Roman rule. Laconic as the graffiti are, systematic study reveals
important insights into prosopography, kinship, personal piety, literacy, and the place of women
at the level of popular, rather than official, culture. Graffiti worldwide attest to the urge to leave
one’s mark on the landscape; the purpose of this study is to examine this universal impulse in the
context of Greco-Roman Egypt.
Ethics in Hollow State: Distinguishing Between Nonprofit and For-Profit Agents of Prisoner Reentry

LeAnn Beaty
Department of Government

New public management (NPM), a reform movement that has shifted the provision of goods and services away from government towards private institutions, is firmly entrenched in the United States. The Hollow State, a metaphor used synonymously with contracting out, reflects the growing trend of using non-governmental networks—often nonprofits but also for-profit organizations—to deliver social services to vulnerable populations. With more than 750,000 individuals released from prison each year, most of whom face formidable barriers to successful reentry, the partnering of criminal justice, social services, and community based services is becoming the preferred solution for addressing the soaring costs of America’s burgeoning correctional system. The findings of this article, which examines the key distinctions between nonprofit and for-profit that facilitate community reintegration, suggest that there are ethical implications intrinsic to the growing number of contracting relationships in the United States that are important not only to the public goals of the contracting decision, but differ according to the organizational form. These differences, however, are eroding.

Enhancing the U.S. Supreme Court Database: The Inclusion of Case Salience Variables

Paul D. Foote
Department of Government

This research is unique in that it is one of the first academic attempts to define and measure moderate judicial decision-making on the U.S. Supreme Court. There have been active academic debates on the relevant influence of stare decisis on the votes of Supreme Court justices. I contribute to this debate by demonstrating that the norm of stare decisis under certain conditions continues to influence the Court’s decision-makers. The data in the study was derived from the Justice-Centered Court Database (1969-2008). Both the alteration of precedent and case salience variables were key determinants in the model for gauging the degree of moderate behavior for each justice. Since the US Supreme Court Justice-Centered Database lacks specific variables to gauge case salience, I added two distinct variables (New York Times and Congressional Quarterly measures) to measure the level of salience for each case (high or low.) The model parameters were analyzed by conducting both descriptive and inferential statistics. Logit regression analysis revealed that Justices Powell and O’Connor were the only so-called moderate justices to consistently exemplify moderate voting behavior. The results of the study contributes to the dialogue whether institutional norms and external factors have a somewhat greater affect on judicial moderate decision-making than on the ideologically bloc justices on the Supreme Court. It also helps close the gap in the academic literature by developing a model to predict under what conditions moderate justices are likely to uphold or not to support precedent. Finally, the results provide a more accurate assessment of the relevance of stare decisis to the Legal Model.
Psychopathy expressed in a dimensional model of personality pathology: Evidence from the MMPI-2-RF Personality Psychopathology Five (PSY-5)

Dustin B. Wygant
Department of Psychology

The psychopathic personality is one that is characterized by interpersonal callousness, dominance, and behavioral disinhibition (Hare, 1996). Some researchers (e.g., Lynam & Widiger, 2007) recommend conceptualizing psychopathy with dimensional models of personality. One such model, the Personality Psychopathology Five (PSY-5) was developed by Harkness and McNulty (1994) by examining diagnostic criteria, Cleckley’s (1941) psychopathy conceptualization, and “normal” descriptions of personality. The PSY-5 model is represented on the MMPI-2 Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008) and its scales include Aggressiveness (AGGR-r), Psychoticism (PSYC-r), Disconstraint (DISC-r), Negative Emotionality/Neuroticism (NEGE-r), and Introversion/Low Positive Emotionality (INTN-r).

The current study examined psychopathy with the MMPI-2-RF PSY-5-r scales. Participants included 94 criminal defendants who completed forensic evaluations at a court psychiatric clinic in northeast Ohio, predominantly to determine their suitability for a drug diversion program (66%). The sample was predominantly male (80%), Caucasian (70%), and had a mean age of 32.5 ($SD = 11.9$). Participants completed the MMPI-2 and were rated on the Screening Version of the Psychopathy Checklist (PCL-SV; Hart et al., 1995) independently of the MMPI-2 results.

Linear regressions were calculated to predict scores on the PCL-SV with the PSY-5-r scales, and accounted for 23% of the variance in PCL-SV total scores, with AGGR-r ($\beta = .34$) and NEGE-r ($\beta = -.25$) as the strongest predictors. Additional regressions indicated that NEGE-r ($\beta = -.31$) and AGGR-r ($\beta = -.27$) were the strongest predictors of the Interpersonal/Affective factor, whereas AGGR-r ($\beta = -.36$) and DISC-r ($\beta = -.23$) were the strongest predictors of the Social Deviance factor.

Results indicate that the affective, interpersonal, and behavioral components of psychopathy can be captured by the PSY-5-r. In particular, NEGE-r captures the absence of emotional arousal, whereas DISC-r measures the disinhibition component of the disorder. Moreover, AGGR-r appears to encapsulate both the interpersonal dominance and aggressive behaviors associated with psychopathy. Implications for future research will be discussed.