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Undergraduate Research Forum

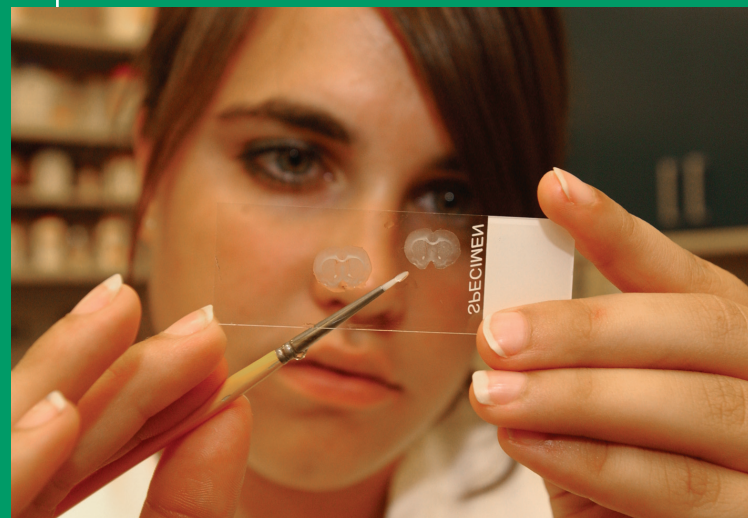
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The Undergraduate Research Forum is part of REACH (Research-Enriched Academic Challenge), a campus-wide program for undergraduates coordinated by the Office of Research Development and Administration at SIUC. For more information, see www.siu.edu/~reach.

UNDERGRADUATE RESEARCH FORUM

ABSTRACTS • 2008



Student Center Ballrooms
March 31, 2008
Southern Illinois University Carbondale

“Undergraduate research—whether it is in the laboratory, studio, library, or clinic—enhances, expands, and enriches the academic experience for students and faculty. The undergraduate student who engages in research under the tutelage of a talented faculty member is well on his or her way to a positive and fruitful education and career.”

—*John Dunn, Interim Chancellor*

“One of the great benefits of attending a research university such as SIUC is that undergraduate students who become involved in research activities work in a professional environment that also involves graduate students and faculty, and gain problem-solving experience that is prized by employers. We are very pleased to offer our students enhanced opportunities of this type through the REACH program.”

—*John Koropchak, Vice Chancellor for Research and Graduate Dean*

“I am very pleased to continue to be involved with the REACH program and this year’s Undergraduate Research Forum. As someone whose academic career began as an undergraduate researcher, I believe such opportunities represent singularly rewarding and motivating experiences for future success in academia and the world at large.”

—*Prudence M. Rice, Associate Vice Chancellor for Research and Director, Office of Research Development and Administration*

Undergraduate Research Forum
March 31, 2008
Southern Illinois University Carbondale

Program

Judging of posters: 8:30 a.m. – 12:30 p.m.
Poster session: 1:00 – 3:30 p.m.
Award presentations: 3:30 p.m.

REACH Director

Meg Martin, ORDA

Organizer

Stefani Hall, ORDA

Sponsors

Office of the Provost
Office of Research Development and Administration (ORDA)
SPEAR (Students Promoting Educational Advancement and Research)

Poster Judges

Najjar Abdul-Musawwir – Art & Design	Karen Lips - Zoology
Jim Allen – Curriculum & Instruction	Kay Nelson - Management
Craig Anz – Architecture	Wayne Paris – Social Work
Laurie Bell – University Honors Program	Gabriela Perez-Alvarado - Chemistry
Steve Belletire – Art & Design	Ruth Anne Rehfeldt – Rehabilitation Institute
Brian Butler – Archaeological Invest.	John Russin – Agricultural Sciences
Lizette Chevalier – Civil & Environmental Engineering	Robert Swenson – Architecture
Bill Crimando – Rehabilitation Institute	Rachel Whaley – Sociology
Eric Ferre – Geology	Lisa Johnson Zee - Rehabilitation Institute
David Gibson – Plant Biology	
Kelly Glassett – Curriculum & Instruction	
Michael Hoane – Psychology	
Melinda LaGarce – Architecture	
Elizabeth Lewin – Educational Administration & Higher Education	

Special Thanks

Prudence M. Rice, Julia Wetstein, Don Rice, and Marilyn Davis

STUDENT PARTICIPANTS / MENTORS

1. Tawny Abraham.....Robert Swenson
2. Andrea ArnieriPat Manfredi
and Andrew Youpa
3. Ashley Baker*.....Melinda LaGarce
4. Shannon BanningGabriela Perez-Alvarado
and Brian Lee
5. Kimberly Bell*.....Matthew Schlesinger
6. Nicholas Birky*Michael Hoane
7. Jared Boulds*Gary & Mary Kinsel
8. Natalie BryantReza Habib
9. Nora BunfordBenjamin Rodriguez
10. Jared Burde*Mercedes Calbi
11. Michael Burns*Brooks Burr
12. Katie Butera*Lisabeth DiLalla
13. Caitlin Carr.....Laura Kidd
14. Kaitlin DornRobert Swenson
15. Jamie Douglas*Karen Jones
16. Garcia Dunning.....Rebecca Weston
17. Darcy ErnatLoretta Battaglia
18. Julius Frazier*Karen Lips
19. Michael GornickAndrew Balkansky
20. Melissa House.....Dale Vitt
21. Donald Hughes.....Timothy Clark
22. Krystelle Jean-MichelEzemenari Obasi
23. Nicholas Kuypers.....Michael Hoane
24. Kathleen Lask*Aldo Migone
25. Christopher Leffelman*Aldwin Anterola
26. Todd MarloKaren Jones
27. Bryan McConomy*Douglas Smith
28. Kara McConville*D. Shane Koch
29. Russell McKeith*Karen Jones
30. Benjamin Mullineaux.....Reza Habib
31. Courtni Nannie.....Eric Jacobs
32. Andrew NewellKemal Akkaya
33. Krishna PattisapuNaida Zukic

[cont.]

REACH (Research-Enriched Academic Challenge)

SIUC's undergraduate research program, REACH, provides one-year awards which are available on a competitive basis to undergraduates conducting research, scholarly, or creative projects under the guidance of a faculty mentor. Applications are accepted each January for the following academic year. Awards include a grant of up to \$1,500 to pay for expenses and a 10-hour undergraduate assistantship for fall and spring semester during the award term. Project funding begins in July.

For more information about the program and application materials, visit www.siu.edu/~reach. You may also contact REACH staff in the Office of Research Development and Administration in Woody Hall C-206, at 453-4540 or via email at reach@siu.edu.

34. Matthew PicchiettiDavid Gilbert
35. Amanda Rabideau*Prema Narayan
36. Naketa Ross*Kathy Chwalisz
37. Joel Smith.....Michael Young
38. Andrew Somor*Karl Williard
39. Amanda Sotiroff.....Steven Dollinger
40. Karie StewartKelly Bender
41. Karen Stone.....Ruth Anne Rehfeldt
42. Edward TiltonMeera Komarraju
43. Benjamin Vandermyde*John Groninger
44. Joan Weber*Deborah Bruns
45. Christopher Williams*Max Yen
46. Toya Wilson.....Sharon Peterson

*Recipient of a 2007-08 Undergraduate Research/Creative Activity Award from the REACH Program

Tawny Abraham

School of Architecture:
Program of Interior Design

Steamboats Built in Metropolis, Illinois on the Lower Ohio River

The purpose of this project is to research, study and document the significant historical topic of the steamboat building industry. We have chosen to focus on the steamboat building industry of Metropolis, Illinois. In particular, attention has been directed toward the interior design of the steamboats. These boats contained elaborate interiors that were created by unknown people. Given the intricacy of details found in the interior of these steamboats, those who created these designs were highly skilled. But who were these people? Were they everyday workers, artists or even designers? Factories developed in Ohio, then Indiana later leading to the factory in Metropolis, Illinois. Did the same people own and run all of the ship yards? During the Civil War time, boats were still being built in Metropolis. Were these boats built by women, elderly men or the disabled? Where did the materials come from? Hardwoods were readily available from the south via the Cumberland and Tennessee Rivers. Many boats were sent for completion to the St. Louis area. We hope to find what services were performed on the boats and where these services took place. The research and final analysis will be compiled into a booklet of maps, timelines, boat photographs, material listings, and other documentation to support our theories. This collection of documents will then be made available in regional libraries, to aid in research of others on steamboats from the region that traveled on the Ohio River.

Toya Wilson

Department of Health Education and Recreation

Barriers to physical activity and healthy eating habits for adolescents at risk for type 2 diabetes: A needs assessment

In the past, type 2 diabetes was known as adult-onset because it occurred mostly in men and women over the age of 50. Over the last decade, type 2 diabetes has become more common among adolescents. Health dietary habits and physical activity can play a key role in preventing or delaying the onset of type 2 diabetes in adolescents. No community based research has been conducted to measure the effect of a program that focuses on physical activity and healthy eating for adolescents who have been identified as “at risk” for type 2 diabetes, which makes this a seminal study. However, designing an intervention program that adolescents can benefit from can be complicated because there are many unique barriers that influence the effectiveness of such a program. The goal of this study was to conduct a needs assessment to identify barriers to physical activity and healthy diet for adolescents at risk for type 2 diabetes in Harrisburg, IL.

Results: The most frequently mentioned barrier identified in this study was lack of motivation to eat healthfully and exercise (60%). Other significant barriers to physical activities or healthy diet mentioned were: lack of age appropriate programs in the town (50%), adolescent’s preference for junk food (50%), and mother’s work schedule preventing monitoring of child’s diet and physical activity (50%). The results of this project will be used to create a community-based intervention program that lowers risk factors and has the potential to prevent the onset of type 2 diabetes in at risk adolescents.

Chris S. Williams

Department of Civil and Environmental Engineering

Development of a Prototype of an Intelligent System

Sensor networks are often used in industry and academia to gather data. The Materials Technology Center (MTC) at SIUC has developed a unique Internet-based wireless data acquisition system that has the ability to gather data from various types of sensors and allow this information to be viewed on a web browser anywhere in the world. The purpose of this project is to apply this wireless data acquisition system and various sensors to practical monitoring applications. A model has been built to demonstrate how this monitoring system can be used for fire detection in buildings. The system is capable of alerting a local fire department via the Internet if a fire erupts in a building and allow the fire department to know the location of the fire in the building before arriving to the site. In addition to this, an earthquake shake table has been designed and built in MTC's laboratory that demonstrates the ability of the system to monitor a structure when it undergoes vibrations due to seismic activity or other sources. The shake table along with the data acquisition system can also be used to conduct tests on materials or model structures. Both of these applications demonstrate the ability of the wireless data acquisition system to be used in the development of an Internet-based intelligent system.

Andrea Arnieri

Department of Philosophy

The Preservation of Dignity for Pediatric Cancer Patients through Respect for Intelligence

One of the most sensitive and complex areas within the field of bioethics is pediatric oncology. Any health care concern dealing with life-threatening illnesses in children is of grave seriousness, yet the prevalence and complexity of pediatric cancer demands specific ethical inquiry. Bioethicists rely on a set of bioethical principles as decision-making guides. While the four principles are designed to respect the dignity of all parties involved, these principles may not be enough to give full regard to the dignity of a pediatric cancer patient. Of the four principles, respect for autonomy becomes particularly complicated with regard to pediatrics because children are assumed to possess little or no autonomy. Thus, children are typically dealt with using only the other three principles. These alone may not be sufficient to give full respect for the dignity of the child. When ascertaining the moral obligations parents and health care professionals have to children, another principle can help to clarify the obligations which these groups have to pediatric cancer patients. The principle proposed and developed here is that of respect for patient dignity. This investigation focuses on the way a child's dignity is respected when they are provided age-appropriate information that is relevant to their well-being. A selection of case studies serves to illustrate ways in which the dignity of pediatric cancer patients has not been adequately respected due to nondisclosure of information. From these case studies, the prejudices through which parents typically justify withholding information from their sick children are revealed. Through a recognition and acknowledgment of these prejudices, an argument is made for respecting the level of intelligence, and hence the dignity of the child, by providing the child with information that bears on their life and circumstances.

Ashley Baker and Melinda LaGarce

School of Architecture

Design Interventions in the Built Environment that Enhance Early Childhood Learning

Can specific design interventions in the built environment enhance early childhood learning? The researcher hypothesizes that they can and is studying the effects of specific environmental interventions designed to enhance early childhood learning in a newly constructed Pre-K Learning Center. The interventions are intended to allow the environment to become a second teacher and to enhance the beauty of the environment in the classroom.

The specific interventions are designed to develop: 1) creativity – innovation, elaboration, flexibility, fluency; 2) aesthetic awareness for composition, scale, proportion, rhythm, color, shape, form, texture; and 3) empathetic sensibilities to the natural environment. The interventions include manipulation of ambient light, life-size images of nature patterns, luminescent outer-space environment, cozy reading corner, and live foliage.

A newly constructed Pre-K Learning Center with two “same as” classrooms has presented the opportunity to track activities, behaviors, and markers of creativity, aesthetic awareness, and empathetic sensibilities to the natural environment by means of discrete video recordings of classroom activities, student/parent/teacher interviews, parent/teacher questionnaires, and analysis of student work by a panel of early childhood education experts. Tracking during the course of the school year will take place for periods of time with the interventions in place and without the interventions in place.

Findings of the study will: 1) contribute to the body of knowledge for designers of early childhood education and special population facilities, and may impact the design of such environments; and 2) contribute to the body of knowledge for educators of early childhood children with possible implementation of such interventions on a much broader scale.

Joanie Weber and Dr. Deborah Bruns

Department of Educational Psychology and Special Education

Findings Across Screening Tools (FAST)

The purpose of this poster is to present findings from a two-year research project. The first year of research was spent completing developmental screening tools on 40 infants and toddlers in southern Illinois. Parents completed the following three developmental screening tools on their children: the Ages and Stages Questionnaire (ASQ), the Ages and Stages Questionnaire: Social Emotional (ASQ: SE), and the Parents' Observations of Infants' and Toddlers (POINT). Child scores were compared to cutoff scores both independently by tool and across tools, and then analyzed for agreements and disagreements across tools. This information is presented briefly.

The second year of research involved item analysis across the three tools. Items were first analyzed as worded on the questionnaires by regrouping items and assessing them based on developmental milestones addressed and specificity. Child scores for individual items were then compared across tools and again analyzed for agreements and disagreements across tools. This information is presented in more depth. Finally, possible reasons for disagreements as well as implications are presented.

Ben Vandermyde

Department of Forestry

Evaluating a Fungal Alternative to Herbicides for the Control of Autumn Olive (Elaeagnus umbellata)

Autumn olive is an exotic shrub species that has been widely planted for wildlife and reclamation benefits throughout Midwestern and Eastern United States. However, autumn olive has become invasive and threatens other conservation values due to its prolific growth and suppression of the native vegetation; prompting control efforts. Control of autumn olive is difficult because of the species' ability to survive cutting treatments. So far, cutting followed immediately by stump herbicide application has been the most effective treatment to remove or reduce the invasive pressure of the shrub. A possible alternative treatment to chemical herbicides involves cutting and applying the fungus, *Chondrostereum purpureum*. *C. purpureum* is registered for use in Canada and has been determined safe to be tested in the United States. The fungus inoculates only on open wounds or fresh cuts of trees and grows down into the rooting system and consumes energy and nutrient reserves. To test these assumptions, two sample locations were selected for study. Forty-five autumn olive shrubs were stump cut at each location and fifteen individuals received a fungus treatment, a comparison herbicide treatment, and an untreated control, respectively. During June, following dormant season application, the visual appearance of the test plots suggests that the herbicide treatment was the most effective with 90% of stumps failing to re-sprout. In contrast, 15% of individuals in the fungal treatment failed to re-sprout. After one growing season, the vegetation from each re-sprouted stump was collected and oven dried for forty-eight hours. Each shrub's total dry weight and average stump diameter was entered into the SPSS data analysis program and an ANOVA test was done. There was no significance between the re-growth between the control and fungus treatment; however, there was significance between the fungal and the herbicidal treatments.

Shannon Banning, Brian M. Lee and Gabriela C. Pérez-Alvarado

Department of Chemistry & Biochemistry

Characterization of the Interaction between Symplekin and the Cytoplasmic Polyadenylation Element-Binding Protein

Symplekin is a tight junction protein with dual localization in the cytoplasm and the nucleus. In the nucleus, symplekin is part of the polyadenylation machinery that regulates the 3' end pre-mRNA processing and assists in the elongation of the poly(A) tail. In the cytoplasm, symplekin can be located in the tight junctions and also participate in the regulation of translation through its interaction with the Cytoplasmic Polyadenylation Element-Binding Protein (CPEB). While the interaction with CPEB is necessary for both their functions, it is unclear exactly how they interact. The purpose of this project is to characterize the interaction between Symplekin and CPEB. This will not only allow for information to be learned about the structural details of each protein, but will also provide insights into the processes that they are involved in. In order to investigate the interactions of symplekin with CPEB, several gene constructs within the N-terminal region of symplekin (residues 1-770) have been isolated using PCR methods and cloned into plasmid vectors suitable for protein expression.

Kimberly Bell

Department of Psychology

Cross Modality Integration and Spatial Memory

Tracking objects in the environment as they move in and out of the visual field has not only proved necessary for survival, but are also part of everyday perceptual experience. The goal of this study was to assess spatial memory under different cueing conditions. In particular, we hypothesized that combining visual and tactile (i.e., touch) sensory cues would improve memory for spatial location, compared to visual cues alone. We evaluated this hypothesis by presenting participants with a computerized spatial-memory task, in which they first viewed a static display with several locations highlighted, and then used the mouse to track the movement of a target that travelled through those locations. Four groups of participants were tested, representing four different combinations of visual and tactile cues. Unexpectedly, our current findings suggest that using visual cues alone leads to better spatial memory than when visual and tactile cues are combined. These findings have real world implications and provide future research on improving memory in situations where spatial elements are crucial (e.g., driving, sports).

Edward Tilton and Dr. Meera Komarraju

Department of Psychology

College Students' Implicit Theories of Intelligence and Theory X/Y Assumptions in relation to Achievement and Learning Goals

College student potential for motivation differs with their assumptions regarding their ability to learn, their theory of intelligence, and the goals they pursue. Some students see that their intelligence is fixed while others believe it is changeable; some assume that students want to learn and others assume that teachers have to push them to learn; finally, some have an intrinsic interest in gaining a college education and others have come for extrinsic reasons. With each relationship, specific beliefs and expectations are produced by the students. Those students who think their intelligence is fixed visualize their instructors as pushing them to learn, and who seek satisfaction mainly through good grades tend to pursue achievement goals. On the other hand, students who enjoy learning new things, think that intelligence is malleable, and feel that students are responsible and motivated, tend to pursue learning and mastery goals. In our study we examined the extent to which these theories and assumptions predict learning/mastery and achievement goals.

Karen Stone

Department of Education and Human Services: Rehabilitation Services Program

Investigating the Efficacy of the Picture Exchange Communication System in Older Adults with Developmental Disabilities

The purpose of this study is to contribute useful information to the current body of research pertaining to Picture Exchange Communication System (PECS) by providing evidence of the effectiveness of this system in older adults with severe developmental disabilities. This specific age group of individuals is often times subject to ageism or discrimination based on age, which often leads to a belief that older people are not capable of learning new information or skills. This study is intended to contest this stigma by teaching older individuals with developmental disabilities to use this alternative communication system and to develop new functional communication skills. This study will address the lack of research concerning PECS and its effectiveness with older individuals and will examine the effects of PECS on participants' functional communication skills. Specifically, the number of spontaneous vocalizations made and amount of eye contact made by the participants will be examined to determine if any increases or improvements can be established.

Nicholas Birky

Department of Psychology

Modeling PTSD in an Animal Model of TBI

Two of the largest public health issues today are traumatic brain injuries (TBI) and post-traumatic stress disorders (PTSD). Current military actions in the Middle-East have resulted in large, significant spikes in both conditions. It is unknown at this time if TBI increases the frequency at which PTSD occurs. Given that there are well established animal models for TBI and PTSD, it is possible to experimentally test this concept. Rats were surgically prepared with either bilateral frontal cortical contusion injuries or sham (non-injury, control condition) injuries. Seventy-two hours following injury, animals were exposed to a natural "predator scent" stress stimulus (fox urine) or a control scent condition. Behavioral testing was conducted on post-injury day 13 on the elevated-plus maze (a standard test of rodent anxiety) and in automated activity monitors. Preliminary analysis of the data revealed that exposure to the predator scent results in significantly greater stress responses on the elevated plus maze than in the animals exposed to the control scent condition. Animals exposed to the predator scent also showed a significant stress response in the automated activity chambers as compared to those that were not exposed. The data suggests that exposure of a rat to a predator scent does increase relevant stress related behaviors when tested 10 days after the exposure, suggestive of PTSD. It was also found that the injured rats also showed significant elevations in stress related behaviors; however, it is unclear if injury results in an exaggerated stress response.

Jared S. Boulds, Mary E. Kinsel, Gary R. Kinsel

Department of Chemistry & Biochemistry

Determination of the Efficiency of Current Methods of Protein Identification

With the growth of proteomics-based research, protein identification has become one of the most important applications of modern mass spectrometry (MS). Protein identification is commonly accomplished by using two-dimensional polyacrylamide gel electrophoresis (2D PAGE) to separate a complex protein mixture, followed by excision of the protein spots of interest, in-gel trypsin digestion and extraction of the tryptic peptides for MS analysis. Increasingly, there is interest in identifying protein spots present at sub-picomole levels. As the amount of protein present in an excised protein spot decreases, the recovery of tryptic peptides from the gel becomes more important. Successful protein identification using MS analysis is highly dependent upon the peptide recovery. Thus, it is essential that the in-gel trypsin digestion protocol be optimized to maximize peptide recovery. Numerous attempts to optimize the in-gel digestion protocol have evaluated the success of their modified protocols by comparing the number of unique tryptic peptides (i.e., percent protein sequence coverage) observed in the mass spectrum. It is not clear that an increase in the percent protein sequence coverage genuinely reflects an increase in peptide recovery. This poster will compare two novel approaches to gauge peptide recovery. Specifically, the tryptic peptide ion signal intensity and the Matrix Science Mascot MOWSE score will be compared to the standard approach for determining peptide recovery based on the percent protein sequence for the model protein, bovine serum albumin.

Karie Stewart

Department of Biological Sciences

Does the RNA chaperone Hfq protein play a role in the stress response of Francisella tularensis, a bioterrorism agent?

The deliberate use of bacteria as a biological weapon has become a growing concern of the United States and many other countries across the world. Many of the bacteria used as biological weapons can cause infectious diseases that can lead to death. *Francisella tularensis*, which causes Tularemia also known as rabbit fever, is one of these potential agents. In order to be successful in combating the infectious nature of *Francisella tularensis*, which is categorized as a bioterrorism agent, a better understanding of its basic biology is necessary. Many components can affect the virulence gene expression of various bacteria. More recently, the Hfq protein has emerged as a global gene expression regulator in bacteria through its interaction with small non coding RNAs (sncRNAs) and messenger RNA (mRNA). In this project, I analyzed the role of the Hfq protein in the stress response of *F. tularensis* subspecies *novicida*, a strain non-pathogenic to humans. Phenotypic characterization of the *hfq* mutant was obtained by growth curve analysis and plating to examine how *F. tularensis* subspecies *novicida* responded under various environmental conditions. Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) and gel analysis were done to determine if the *hfq* gene was expressed under these same environmental conditions. My findings indicate that the Hfq protein is necessary for normal growth under various environmental conditions, such as rich nutrient medium, limited nutrient medium, heat stress of 42°, and at a neutral pH of 7.0 and are not necessary for growth under an acidic environment. The data obtained will provide critical background information for future studies on *F. tularensis* and possibly lead to a potential target for vaccine development.

Amanda Sotiroff

Department of Psychology

Creativity and Cravings: A Study of Substance Use and Visual Art

Visual artists throughout history have engaged in a special use of substances which is concurrent to their creative achievements. These observations suggest a special link between creativity and substance use. Artists may feel that they need to use substances in order to be creative, and therefore have patterns of usage which are different from other addicts. Psychology students (N=36) from a large Midwestern university were given two creativity tests, the Test of Creative Thinking (Drawing Production) and Pattern and Line Meanings, in addition to a survey including the Big-Five Inventory, Hocevar's Creative Behavior Inventory, Kumar's Creativity Styles Questionnaire-Revised, impulsivity items from Costa and McCrae's NEO-PI-R, and an alcohol and drug survey. Based on the data collected, we expect a positive correlation between openness to experience and creativity. We also expect creative people to report high substance use before or after a creative activity. The age at which someone begins using substances such as marijuana should also be negatively correlated to creativity.

Natalie Bryant

Department of Psychology

Reaction Times during the Encoding Phase of DRM Word Lists and their Critical Lures

The DRM phenomenon predicts the likelihood that participants will remember a novel but semantically related word after studying a block of associated items. Previous research has indicated that critical lures elicit faster reaction times at retrieval because they are mistaken for a familiar item. In the present study, reaction times to the critical lure are measured at encoding. A variation of the DRM paradigm is administered to participants, wherein some lists are repeated and include their critical lures at encoding. A desktop computer records their reaction times to an abstract/concrete response task. A successive retrieval task shows all words presented at study in a random order, as well as ten new lists and additional critical lures. The prediction is that, although novel, critical lures elicit similar reaction times as familiar items.

Nora Bunford

Department of Psychology

Self-Focused Attention in Public Speaking Anxiety

It has been shown that self-focused attention plays a significant role in the maintenance and severity of several psychopathologies such as mood disorders, anxiety disorders, and schizophrenia. The present study focuses on the role of self-focused attention in public speaking anxiety. We plan to have 20 undergraduate Psychology 102 students participate. Participants have been assigned to three different conditions. These conditions are the 1) Speaker delivering an extemporaneous speech about him or herself; 2) the Speaker delivering an extemporaneous speech about the Passive participant; and 3) the Passive participant. We hypothesize that the Speaker will experience higher levels of anxiety than the Passive participant. We further hypothesize that the Speaker will experience higher levels of anxiety during the delivery of the self-focused speech. Our study will also test the Speaking Cognitions and Attention Scale (Rodriguez & Beck, 2007) designed specifically for the purposes of our study.

Andrew J. Somor and Karl W.J. Williard

Department of Forestry

Impact of Exotic Species Management on Soil-Water Nitrogen Levels in Autumn Olive Stands

The ability of a riparian buffer system to trap and filter pollutants is determined in part by characteristics of the vegetative cover within the buffer. Previous research has demonstrated that sites dominated by nitrogen fixing plants contain excessive levels of nitrate within the soil (Baer et al. 2006, Compton et al. 2003), leading to their characterization as nitrogen sources. This project sets out to investigate the effect of management of the exotic, nitrogen fixing autumn olive (*Elaeagnus umbellata*) shrub on the cycling of nitrogen within the plant, soil, and water system. Nine plots, measuring 6 meters by 6 meters, containing dense autumn olive cover were established in southern Illinois. Each of the nine plots was randomly assigned one of three treatments: 1) autumn olive removal, 2) removal plus cut stump herbicide application, or 3) no action, with each treatment assigned to a total of 3 plots. Soil water from each plot was sampled using porous cup tension lysimeters in two week intervals since December 2007 and will continue through May 2008. Samples were analyzed for NO₃-N and NH₄-N concentrations in the Department of Forestry's Water Quality Laboratory. Mean soil water nitrate-N concentrations were 6.82 ± 1.82 (Std. Dev.) mg L⁻¹ in intact autumn olive plots, 11.82 ± 3.02 (Std. Dev.) mg L⁻¹ in autumn olive removal plots, and 11.02 ± 0.30 (Std. Dev.) mg L⁻¹ in autumn olive removal plus herbicide treatment plots. The increased nitrate leaching in autumn olive removal plots is likely due to increased soil nitrification, which apparently outweighed any reductions in symbiotic nitrogen fixation. Mean soil water NH₄-N concentrations were not significantly different among the three treatments. Continued sampling carried out during the growing season will reveal whether nitrate leaching increases, stabilizes, or decreases in the removal plots. It is hypothesized that the initial nitrate flush due to nitrification of soil N pools will decrease and soil water NO₃-N concentrations in removal plots will fall below intact, unmanaged plots. However, this hypothesized N reduction phenomenon may not be apparent for several growing seasons, depending on the cycling of the existing soil N pools.

Joel Smith

Department of Psychology

Peripheral Objects and Their Effects on Rate Change Perception and Stopping Ability in a Driving Task

The current study will test the reactions of subjects to objects at difference distances (close, middle range, and far) in the periphery of the visual field. The project tests the hypothesis that objects in the periphery of the forward visual angle affect the ability to perceive rate change and, by extrapolation, stopping ability. Participants will complete a computer simulated driving task based on a between-subject design that randomly runs each subject through all of the experimental conditions. Rates of acceleration and deceleration will be recorded. The hypothesis is that the closer the peripheral objects, the more they will affect the ability of the drivers to not only perceive acceleration and deceleration accurately, but also their ability to stop accurately within a pre-set area. All the stimuli will be counterbalanced in their presentation so that there are no learning effects for the task.

Preliminary results indicate that the hypothesis that the closer objects will affect driver accuracy appears at this point to be consistent. The participants appear to be stopping too soon, in general, indicating a perception of greater speed, when the peripheral objects are closer to the line along which the vehicle is traveling. The close condition has the greatest effect so far, with the middle range condition having a slightly less, but still noticeable effect. In the far range condition, the participants seem to be better at judging an accurate stopping distance, indicating a more accurate perception of the actual speed at which they are traveling.

Jared T. Burde and M. Mercedes Calbi

Department of Physics

Adsorption Kinetics of Diatomic Molecules on Carbon Nanotube Bundles

Carbon nanotubes exhibit remarkable sorptive properties that make them well-suited for a range of applications related to gas separation and storage. While many studies have focused on the equilibrium characteristics of systems of carbon nanotubes, comparatively little work has been done with regard to the kinetics of adsorption. The time a system requires to equilibrate is an important consideration in any potential application.

Most of the kinetic studies completed so far have focused on systems of monatomic, quasi-spherical ad molecules. Though these projects have given valuable insights into the equilibration process, they cannot provide a complete picture of the adsorption process. In most practical situations, the adsorbates are polyatomic in nature, which leads to effects caused by the orientation of adsorbed molecules with respect to each other and the substrate. This project begins the process of closing this knowledge gap by studying the kinetics of adsorption of dimers, the simplest polyatomic molecules.

Using computer simulations employing the Kinetic Monte Carlo algorithm, we can calculate the coverage of a one-dimensional lattice, representing a groove between adjacent carbon nanotubes, as a function of time. For a range of equilibrium coverages, we can observe the preferred orientation of the molecules, which can either lay flat or standing on end, and thus find any phase transitions that may take place. However, we can also track the orientation of each molecule throughout the equilibration process, giving us valuable information about how the adsorbates move around the lattice and how long they need to reach their equilibrium configuration.

We expect to see a preference for horizontal molecules at low coverages, where the finite size of the lattice does not restrict adsorption, with a shift towards vertical particles at higher coverages. We also predict that the flat molecules will adsorb more quickly, eventually standing up to allow more particles to adsorb at higher pressure.

Michael D. Burns and Brooks M. Burr

Department of Zoology

Shape Analysis and Systematic Status of the Blenny Darter, Etheostoma blennioides, a Percid Fish from the Tennessee River Drainage

The Blenny darter, *Etheostoma blennioides*, is comprised of two morphologically distinct subspecies of fish, *Etheostoma blennioides blennioides* and *Etheostoma blennioides sequatchiense*. The purpose of this study was to examine the degree of morphological variation between the two subspecies to determine if a taxonomic revision was needed. The degree of sexual dimorphism that exists within each subspecies was also examined. Preliminary results and a genetic data set suggested that enough visible differences existed for each subspecies to be elevated to species level and that fin lengths would differ between the sexes in each subspecies. Body shape variation was calculated through traditional morphometric methodology and analyzed by performing a sheared principal components analysis (PCA). Thirty characters were used to assess the body shape of 100 specimens (50 of each subspecies). The two measurements of snout shape and the caudal peduncle length were found to have significantly high loadings in a sheared PCA. The graph of the principle component II vs. principle component III of the sheared PCA conveyed no overlap between the two polygons putatively representing the subspecies, indicating that *E. b. blennioides* and *E. b. sequatchiense* are distinct species. These results suggest that the two subspecies of *Etheostoma blennioides* are distinguishable based on body shape analysis (primarily snout shape and caudal peduncle length) and should be elevated to species level.

Naketa Ross

Department of Psychology

Effects of Resilience, Social Support and Campus Involvement on Persistence

The present study explores the effects of resilience, social support and campus involvement on persistence. The study includes a sample of 100 students at a large Midwestern university to assess if a positive relation exists between the students' resilience, campus involvement and perceived social support as it relates to academic persistence. Resilience is a universal capacity which allows a person, group or community to prevent, minimize or overcome the damaging effects of adversity (Grotberg 1995). I hypothesize that individuals with high levels of resilience will show optimistic attitudes towards campus involvement, and possess higher levels of perceived social support. This in turn would positively affect academic persistence and the students' decision to stay in school. Implications for colleges and universities will be discussed.

Amanda Rabideau and Prema Narayan

Department of Physiology

Premature Luteinization of Granulosa Cells Due to Constitutive Activation of the Luteinizing Hormone Receptor

Luteinizing hormone (LH) is a principal gonadotropin secreted by the anterior lobe of the pituitary gland that binds to the LH receptor (LHR) and is essential for reproductive function. In order to observe the effects of premature activation of LHR on the proliferation and degeneration of ovarian follicles, mice expressing a genetically engineered constitutively active LHR (YHR⁺) were studied. Initial qualitative histological observations of the ovaries appeared to indicate an increase in the number of developing follicles and corpora lutea (CL) in prepubertal ovaries and increased follicular degeneration in ovaries of adult YHR⁺ mice compared to their wild type (WT) counterparts. To confirm these initial observations, an extensive quantitative histological analysis of follicular development in mice of various ages was performed by creating serial sections (7µm) of the ovaries. The follicles were classified as “primordial” if the oocyte was surrounded by only a single layer of fusiform granulosa cells, “primary” if the oocyte was enlarged with a single layer of cuboidal granulosa cells, “preantral” when at least two layers of granulosa cells were present, “early antral” when a confluent antrum was present, and “preovulatory” when there was a large antrum present and the oocyte was displaced in an eccentric position. Our results show that higher numbers of CLs are present in YHR⁺ mice compared to WT mice by 5 weeks of age. By 8 weeks of age, after the onset of normal puberty, the WT mice begin producing CLs due to ovulation, but YHR⁺ mice continue to exhibit greater number of CLs. No significant differences were observed in the number of follicles at other stages of development in WT and YHR⁺ mice. These data suggest that the primary consequence of premature LHR activation is follicular luteinization either due to premature ovulation or luteinization in the absence of ovulation.

Katie Butera

Department of Psychology

Cooperation Development in Young Twins

This study examined the difference between the cooperation levels of monozygotic twins (MZ) and dizygotic (DZ) twins, which is unclear from previous research. It was hypothesized that MZ twins would exhibit higher levels of cooperation than DZ twins and that cooperation development would contain a genetic component. The sample consisted of 86 twin pairs (27 MZ; 40 same-sex DZ; 19 opposite-sex DZ). Participants engaged in a video-recorded triadic interaction with their co-twin and parent, later coded for cooperative and non-cooperative behaviors. There were no significant differences for cooperation between MZ twins ($r=.98, p<.001$), same-sex DZ twins ($r=.98, p<.001$) and opposite-sex DZ twins ($r=.93, p<.001$). Non-cooperation correlations showed that MZ twins ($r=.47, p<.05$) were more similar to each other than were same-sex DZ twins ($r=.16, p=ns$), suggesting a heritability component of approximately .47. In addition, non-cooperation correlations of opposite-sex DZ twins ($r=.54, p<.05$) were higher than for same-sex DZ twins ($r=.16, p=ns$), suggesting that sex has an effect on non-cooperation levels. A one-way ANOVA also was performed for all same-sex twin pairs to analyze the effect of sex on cooperation. This showed a marginal effect ($F(1,66)=3.45, p<.07$), with girls exhibiting more cooperation than boys. Contrary to expectation, the results of the study demonstrated that cooperation is not heritable at this age because the correlations were very high for all groups of twins. However, there was a heritable component found for non-cooperation indicating that this difficult behavior has some genetic influence. In addition, girls were found to be slightly more cooperative than boys and may even elicit cooperative behaviors from their boy co-twins in opposite-sex pairs.

Caitlin Carr and Dr. Laura Kidd

School of Architecture:
Fashion Design and Merchandising Program

Layers of Culture: The Mola

The Kuna Indians of Panama live on 38 islands along the Caribbean coast from Mandiga Bay to Puerto Obaldia at the Colombian border. In each village, men are typically associated with verbal arts such as chanting or singing at village meetings, while women are associated with the visual arts, mainly *mola* making. *Molas* are rectangular pieces of fabric that are sewn using reverse and regular appliqué techniques to form various, multicolored designs from layers of fabric. Fabric pieces are then sewn onto blouses, part of Kuna women's everyday costume, to form the front and back panels. *Molas* have been created by Kuna women for over a century and still remain a prominent part of the Kuna society today.

Because of a decreased ability to grow and trade coconuts on Kuna Yala, *molas* have become a form of commodity for the Kuna people. Women have become the primary wage-earners for the villages by selling their old *molas*, or *molas* they have made especially for tourists called *turista molas*. The demand for *turista molas* by visitors has grown tremendously over the years, and as a result, the Kuna women have sacrificed the quality of their *molas* for the needed quantity. This leads some anthropologists to believe that true, high-quality *mola* work may be in danger of extinction.

For this study, four *molas* housed in the SIUC Historic Costume Collection were studied to discover (1) the materials used; (2) the techniques used; (3) the type and significance of the designs used; and (4) a determination of purpose (i.e., a *mola* created as a *turista* piece or a *mola* created as personal costume, referred to as "authentic"). The cultural and economic roles of *mola* in Kuna society were also investigated.

Matthew A. Picchietti

Department of Psychology

Effects of Nicotine on EEG and Performance of Male Smokers and Non-Smokers with ADHD Symptoms

Rationale: Individuals with Attention Deficit Hyperactivity Disorder (ADHD) benefit from the effects of nicotine, but little is known about the mechanisms underlying these effects. **Objective:** This study evaluated the effects of nicotine on the electroencephalography (EEG) and performance of smokers and non-smokers with symptoms of ADHD. **Methods:** On two separate 12-hour prior abstinence days, a placebo versus active transdermal (TD) nicotine patch design was used. We measured impulsivity with the Go-No-Go (NOGO) task, emotional distractibility during reading with the original Color Cue task, and took a measure of resting EEG. **Results:** We expect to find that in both smokers and non-smokers with ADHD symptoms nicotine will normalize resting EEG (decrease slow-wave power), improve response inhibition on the NOGO task, and decrease reaction time (RT) to positive word targets paired with negative word distractors on the Color Cue task. **Conclusions:** Our expected results would be important because the effects of nicotine on impulsivity are not well documented and are disputed in the ADHD literature. The use of non-smokers, as well as smokers, will also help differentiate between withdrawal alleviation and inherent effects of nicotine on task performance and EEG activity.

Krishna Pattisapu

Department of Speech Communication

Beyond Essentialism: Re/presentations of Interracial Relationships in Paul Haggis' Crash

In this project, I examine the 2005 film *Crash* in an effort to identify racial discourses, which work to advance essentialized representations of marginalized racial groups. I challenge the film's status as a social commentary on race, focusing on the ways in which its mediated re/presentations of race further perpetuate hegemonic discourses on race that the film sets out to challenge. Re/presentation, according to Hall, refers to the process of standing in for a particular depicted person or situation. Representation, conversely, refers to the process of assigning a meaning or value to a depicted person or situation ("Representation and the Media"). Additionally, I deploy an autoethnographic perspective in order to address my relationship to the film as an individual involved in real-life interracial relationships. In doing so, I hope to explicate the ways in which representations of race in *Crash* work to fix social perceptions of race and interracial relationships. I garner my theoretical insights from Stuart Hall's theories of race, media, and representation, and more concretely their relationship to power and ideology. Finally, Michel Foucault's notion of subjugated knowledge offers a theoretical framework within which I analyze my positionality and the ways in which it has influenced my relationship to the film.

Kaitlin Dorn and Robert Swenson

School of Architecture

Architectural History: Kornthal Church and Parsonage, Union County, Southernmost Illinois

The purpose of the present study was to research and document a history of Kornthal Church for the community and future researchers. Kornthal Church was built shortly after people settled in a little town south of Jonesboro, IL. Starting this past summer, in Preservation Summer 2007, our class began researching and documenting the church. During the undergraduate research assistantship, I have been completing the CAD drawings of the church in Historic American Building Survey format. They will be sent to the Library of Congress at completion.

The study also addressed how the community was able to attain this information. Over the summer, local residents and family members came to the church with photos and to participate in oral interviews. They shared their information with an expectation that later on they could revisit their families' history. That was when I started on website design. My main goal was to put the research information about Kornthal Church and Parsonage on the website to make it accessible to the public and those involved in the research with me. Now, the School of Architecture is looking to find a way to get this course project information online. The purpose of my poster and participating in the Undergraduate Research Forum is to make the information I have gathered public.

JM Douglas and KL Jones

Department of Animal Science, Food and Nutrition

Effects of ergotamine-D tartrate on bovine oocyte maturation

Fescue toxicosis is a livestock disease that results in economic losses through decreased weight gains and reduced reproductive efficiency. Preliminary data suggests that meiotic development may be impeded after cattle consume diets composed of endophyte-infected fescue. To investigate the possibility of reduced meiotic competence, bovine oocytes were collected from ovaries obtained at a local abattoir and divided into one of four treatment groups. The control treatment was comprised of TCM 199 medium with 0.1 U/ml FSH, 0.1 U/ml LH, 10% (v:v) fetal calf serum, and 1% (v:v) pen/strep. Treatment 2, 3, and 4 consisted of control medium with the addition of ergotamine D-tartrate at 1×10^{-5} , 1×10^{-8} or 1×10^{-11} M, respectively. Following 24 hours of culture at 35° C in a humidified atmosphere of 5% carbon dioxide in air, cumulus cells were removed from each oocyte. Oocytes were then stained with Hoechst 33342 and observed with a microscope equipped with a fluorescent light source. Evidence of completion of meiosis I was analyzed by determining the presence or absence of the first polar body and metaphase plate. Analysis showed that the addition of 1×10^{-5} M ergotamine D-tartrate to treatment media significantly ($P < 0.01$) reduced the ability of the oocyte to complete meiosis I. This result suggests that an accumulation of fescue endotoxins may reduce bovine fertility by inhibiting proper maturation of the oocyte.

Andrew Newell and Kemal Akkaya

Department of Computer Science

Implementation Experiences with Motes and TinyDB in a Greenhouse Monitoring Application

While a lot of real-life deployments of Wireless Sensor Networks (WSNs) have been done, there is still no standard on the used architectures, middleware and software. In this poster, we present our design and implementation experiences with a real-world implementation of TinyDB in a Greenhouse Monitoring Application. Our goal is to share such experience with application designers and users who are new to the area so that better decisions can be made in similar works regarding the implementation. We were able to record temperature readings from a greenhouse located on campus on October 26, 2007 via a Wireless Sensor Network. The data collected from the greenhouse was sent over the internet and stored on a server machine hosting a website in real-time. So, anyone who goes to this website can see temperature readings taken just seconds before from a mote in the greenhouse. Also, we were able to get the motes to Multi-hop which means that each mote does not have to connect directly to the base station, but instead can send information to neighbor motes which can forward the information to the base station. This is important in real-world applications since it allows for WSN to span great areas while using lower transmission power. We did run into problems with weather, since the motes are not water proof and the greenhouse leaks quite a bit. Overall, we learned a lot that can be offered to people interested in the real-life deployment of a Wireless Sensor Network.

Courtnei Rae Nannie

Department of Psychology

Optimal Foraging in Rats: Effects of Travel Time on Within Patch Dwell Time

Foraging in a patchy environment was simulated using a choice of diminishing returns procedure. Four black hooded rats made repeated choices between a fixed-interval and a progressive-interval schedule of milk presentation. The progressive-interval schedule commenced at 0 s and increased by fixed increments of 4 s with each milk presentation delivered by that schedule. Selection of the fixed-interval schedule not only produced reinforcement, but also reset the progressive-interval back to 0 s. The fixed-interval schedule value was 16 s, 32 s, or 64 s, depending upon component. Three components with different stimulus conditions were presented in each daily session. The progressive-interval schedule simulates the diminishing rate of return that is characteristic of a patch of resources. The fixed-interval value is analogous to the costs of leaving the current patch and traveling to a new patch of resources. According to Charnov's (1976) Marginal Value Theorem, within patch dwell time (highest progressive value chosen) should increase as a function of travel time (fixed-interval value). To date, preliminary results are in qualitative accord with these predictions.

Garcia Dunning & Dr. Rebecca Weston

Department of Psychology

Race/Ethnicity Moderates the Association of Religiosity and PTSD Symptoms

This study examined the relationship between religiosity and Post Traumatic Stress Disorder (PTSD) symptoms. Specifically, the hypothesis that greater religiosity is associated with lower PTSD symptomatology was tested. Further, a hypothesized moderating effect of race/ethnicity was tested. Higher levels of religiosity were expected to be more strongly associated with lower levels of PTSD symptoms in African-American women than among Euro-American or Mexican-American women. These predictions were examined in a sample of 835 women from the Dallas Metropolitan area who participated in a multiwave longitudinal study, Project HOW: Health Outcomes of Women. The women self-identified as African-American (n = 302), non-Hispanic Euro-American (n = 273), and Mexican-American (n = 260). The Crime Related PTSD (CR-PTSD; Saunders, Arata, & Kirkpatrick, 1990) assessed PTSD symptoms. Religiosity was measured with items of self-rated influence of religion in the participant's life. The questions included frequency ratings of church attendance, prayer, and use of church, Christian counselor, or minister for coping based on Neff and Hoppe's (1993) scale. Preliminary results of this study indicate that religiosity predicts lower PTSD symptoms only among Mexican American women, and that frequency of prayer, specifically, explained 3% of variance in PTSD symptoms. Further investigations of the results' relevance of religiosity in PTSD symptom assessment and treatment will be discussed.

Darcy Ernat

Department of Zoology

Can outbreaks of native herbivores facilitate growth of an invasive tree species?

Chinese Tallow (*Triadica sebifera*) is an exotic tree species brought from Eastern Asia to the US in the late 1700's. Since then, people have planted it widely because of its spectacular autumn foliage. The tree's hardiness, rapid growth, and ability to survive in many habitats have contributed to its prevalence in ecosystems throughout the southeastern US. In the floating marshes of the Mississippi Delta, its dispersal and germination are facilitated by the native wax myrtle (*Morella cerifera*) shrub. Once established, however, tallow is shaded by their dense, evergreen shrub canopies. I hypothesize that defoliation events that reduce native shrub cover provide opportunities for tallow to bypass this filter and eventually reach the canopy. In spring 2008, I will germinate tallow seeds and then plant 25 tagged seedlings randomly throughout each of five control plots and five experimental plots in the floating marshes at Barataria Preserve in New Orleans, LA. In the summer, I will simulate an outbreak of the white-marked tussock moth (*Orgyia leucostigma*), an herbivorous caterpillar that periodically defoliates wax myrtle, and track responses of tallow seedlings during the 2008 growing season. To quantify the differences in canopy openness between the two groups of plots over the course of the experiment, I will take a digital, hemispherical photograph in the center of each plot and estimate canopy openness using GLA, a canopy analysis software package. Growth of the seedlings will also be measured each time I visit the plots. All surviving tallow seedlings will be harvested at the end of the experiment. Leaf and root area will be measured using WinFolia and WinRhizo software, respectively. Seedling material will then be dried to a constant weight, and the aboveground and belowground biomass will be determined. After the defoliation, I expect the tallow seedlings, once veiled in the shade of the wax myrtle, to experience a rapid increase in height and increase aboveground and belowground biomass. Events that reduce competition with natives should favor tallow's ascent into the canopy and enable it to reach sexual maturity faster. My research will address the role that interactions between native herbivore and plant species can play in exotic species invasion, an area that has received little attention in the literature. A better understanding of factors that influence the life cycle of the Chinese tallow will be useful to managers charged with controlling this aggressive invader.

Benjamin Mullineaux

Department of Psychology

The Emotional Modulation of Perception: An Assessment of Valence and its Lasting and Acute Effects on Visual Discrimination

The present study is designed to evaluate the extent to which emotional stimuli produce lasting changes in visual perception. Emotional valence can be either "positive" or "negative" indicating their pleasant or unpleasant nature respectively. Both positive and negative images have been found to create increased attention. This study will utilize this attention effect in order to modulate performance in a visual perceptual learning task. The task will consist of 15 blocks of 52 trials. First, there will be 3 pre-test blocks of the orientation discrimination task where participant's baseline levels of discrimination are obtained for three different orientation pairs. The two lines within each pair will be offset by a small 2 degree separation on a central axis. Participants will then complete 9 blocks of task training where each of the three orientations is associated with a briefly displayed (ms) preceding emotional, neutral, or null stimulus. Finally, after training, subjects will complete 3 post-test blocks identical to the pretest. Throughout the experiment, each participant's task will be to determine whether the two lines displayed in each trial are the same or different from each other. Visual perceptual learning is assessed by comparing accuracies at pre- and post-test where there are no image associations. It is predicted there will be an overall improvement in accuracy for each of the three pairs of lines. However, the pair which is associated with emotional stimuli is expected to show the greatest amount of improvement from pre- to post-test. With emotions and determining small differences in our visual field being a part of every day life, information regarding the potential connection between these two basic human functions would be valuable.

Russell McKeith and Karen Jones

Department of Animal Science, Food, and Nutrition

The Effect of pH on Frankfurter Characteristics

The pH in processed meats, specifically frankfurters, can affect color, texture and shelf-life of the product. The purpose of this study was to investigate the effects of pH on color, textural properties, shelf-life, and consumer acceptability of frankfurters.

Twelve 11 kg batches of beef lean, pork fat, and beef fat were formulated for 20% fat mixture. These batches were assigned to one of 4 treatments with 3 batches per treatment. Treatments were: low (pH=5.60), intermediate (pH=6.00), high (pH=6.30) and control (pH=5.90). Differences in pH were achieved with addition of acid, neutral, and alkaline phosphate at 0.4% in the finished product. Evaluations included consumer sensory panel, objective color, texture, and shelf-life. Shelf-life samples were stored in a retail display and evaluated at 0 wk, 3 wk, 6 wk, 9 wk, and 15 wk. Colony forming units were counted for each sample to quantify microbial contamination. Panelists (n=145) of varying ages evaluated all 4 treatment groups after heating the frankfurter in boiling water, to an internal temperature of 65.5°C. Data were analyzed with the proc mixed procedures of SAS.

Texture was different among all treatment groups ($P < 0.05$). When comparing L^* , a^* , and b^* values were significantly different ($P < 0.05$) between pH treatments, with high and intermediate treatment groups having higher L^* values. Low treatment group samples were redder than other treatment groups. There was no significant difference in the shelf-life ($P > 0.05$). Consumers rated high pH frankfurters more acceptable than all other treatment groups. However, consumers preferred color of low pH frankfurters compared to other treatments.

Results from this study suggest that use of phosphates to alter pH can alter texture, color, and consumer acceptability of frankfurters. Processed meat manufacturers may consider increasing pH of their frankfurters due to better textural properties and consumer acceptability.

Julius A. Frazier and Karen R. Lips

Department of Zoology

Losing their cool with climate change: Boa constrictors on a tropical island

Thermal environments affect the physiological performance of ectotherms either by directly affecting survival or by influencing efficiency of foraging and reproduction. Thermal environments vary spatiotemporally and the magnitudes of thermal habitat variations are important under the current projections of global climate change. Comparing distributions of available thermal environments to what individuals use, we can understand limitations in ecologies and behaviors of a population. I studied the thermal ecology of a population of *Boa constrictor* on the island of Cayo Cochino Pequeño, Honduras (May-August 2006). Snakes occurred in three forest types: (1) riparian oak forest (35% of island) offered a heterogeneous thermal habitat; (2) gumbo-limbo forest (40% of island) was uniformly moderate; and (3) wind-swept oak forests (25% of island) were thermally extreme. I placed snake models of the same size, shape and reflectance in each habitat to determine temperatures available (T_e) to snakes, and compared that to the body temperatures (T_b) of wild snakes. Average T_e varied among habitats, 26.7 ± 1.6 in oak forest, 27.0 ± 2.8 in Gumbo-limbo and 27.7 ± 3.1 in windswept. I captured 185 boas: 84 (50.6%) in oak forest, 49 (29.5%) in Gumbo-limbo and 33 (19.8%) in wind-swept forest. I calculated thermal quality (d_e) of each habitat, which is the average deviation of T_e from the snakes' preferred temperature range (24-29 °C). Habitats differed in thermal quality (ANOVA $F_{2, 921} = 70.46$, $P < 0.0001$); gumbo-limbo offered the best ($d_e = 0.31$), oak forest was intermediate (0.45), and wind-swept oak (0.79) was the worst.

Annual increases of only a few degrees will likely cause thermally suitable areas of the island to eventually decrease up to 65% (wind swept and gumbo-limbo habitats), leaving an area of only 35% of the island thermally suitable for *Boa constrictors*.

Dr. Andrew Balkansky and Michael T. Gornick

Department of Anthropology

Preliminary Analysis of Aztec Period Pottery from Teotihuacan, Mexico

The proposed archaeological study aims to identify and describe the Aztec style pottery from Teotihuacan, Mexico, during the Postclassic to early Colonial periods (ca. AD 1200-1500) using complementary scientific methods. This study is one component of a larger project that includes studies of an Aztec-style temple and associated rare ritual deposits from the site. The overall goal of the project is to understand the chronological relationships among the Aztec community at Teotihuacan, Aztec settlements outside Central Mexico, and the Aztec capital of Tenochtitlan (cf Garraty 2006). Ultimately, the proposed project would help us understand Aztec social and political organization outside the Aztec capital city. In doing so it would contribute to our understanding of the Aztec Empire, which at present is based primarily on ethnohistoric accounts. The project results will be published as a co-authored paper in a peer-reviewed publication, such as *Ancient Mesoamerica* or *Latin American Antiquity*. The results of the ceramic study will also be presented at the Society for American Archaeology meetings in St. Louis in the spring of 2010.

Kara McConville & Dr. D. Shane Koch

Department of Education and Human Services: Rehabilitation Services

Contingency Management: A Treatment Plan for Methamphetamine Abuse in Southern Illinois

Contingency Management is an addition to traditional substance abuse treatment whereby positive actions are positively reinforced by monetary awards. In this case, positive actions are participants' ability to abstain from methamphetamine use and achieve extended periods of sobriety. Objectives of utilizing this treatment modality are to: a) employ new treatment approaches to enhance recovery rates for persons experiencing methamphetamine use disorders; b) determine the effectiveness of adding contingency management (CM) to an existing treatment modality (the Matrix Model); and c) improve the capacity of the professional addictions counseling workforce in Southern Illinois through preparing them to implement new techniques in the treatment planning of their consumers. Overall, this project should accomplish the introduction of new and effective treatments for persons who need rehabilitation services while contributing new knowledge to the field of rehabilitation.

Within the last three months, participants have undergone multiple phases of the implementation of Contingency Management modality, combined with the regular treatment they receive as part of the Matrix Model program at Franklin Williamson Human Services (FWHS). Roughly 100 participants were allowed to draw out of a prize bowl for each clean urinalysis they turned in. If a client was unable to submit a clean urinalysis, they were unable to draw from the prize bowl until they again could produce a clean urine drop. Currently, preliminary data shows that although there is not a statistically significant change in the amount of clean drug tests, there is a significant increase in the rate of client's attendance to group and individual therapy.

Bryan C. McConomy

Departments of Psychology & Physiology

Traumatic Brain Injury: The Importance of Norepinephrine in Recovery of Function

Traumatic Brain Injury (TBI) is a silent epidemic with no known cure. The social, emotional, psychological, and socio-economic impact of TBI are often severe and detrimental not only to the victim, but also to loved ones and society at large. Preclinical studies of Vagus Nerve Stimulation (VNS) in rodents have demonstrated significant functional recovery after TBI. It is postulated that the mechanism of action underlying the effectiveness of VNS in the treatment of TBI is the propagation of electrical pulses up the vagus nerve which stimulates the release of norepinephrine (NE) from the locus coeruleus (LC). Specifically, ascending fibers from the vagus nerve terminate in the nucleus of the tractus solitarius (NTS) which projects directly and indirectly to the LC. The LC is the main source of NE in the brain. NE has long been proposed to play a role in post-TBI recovery. The objective of this study was to evaluate this postulated mechanism of action and to clearly determine the significance of NE in VNS. Using 6OHDA, neurotoxic lesions of the LC were induced bilaterally in some rats, causing an approximate 90% depletion of NE in the brain, as assessed by high performance liquid chromatography (HPLC). All rats were subjected to TBI and VNS treatment in accordance with previously published methods. Recovery was assessed using the beam walk task. As expected, when the LC is intact, VNS treatment results in optimal and accelerated recovery after TBI. However, when NE is depleted via LC lesions, brain injured rats do not recover, even when VNS treatment is provided. This study conclusively demonstrates the significance of the LC in the mechanism of action underlying the efficacy of VNS treatment in TBI, and provides added evidence to the role of endogenous NE in recovery of function after TBI.

Melissa House¹, Dale H. Vitt¹, R. Kelman Wieder², Medora Burke-Scoll², and Kimberli D. Scott²

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The Effects of Atmospheric Nitrogen Deposition on Ecosystem Performance in Boreal Peat Bogs

Increased activity to extract oil sands in western Canada could increase nitrogen outputs into the atmosphere. The nitrogen emissions result from truck transportation of the oil sands and equipment. Peat bogs receive all nitrogen from atmospheric deposition and are nitrogen limited. Increased nitrogen deposition in peat bogs could negatively affect ecosystem performance; species of the moss genus, *Sphagnum*, are key elements of this ecosystem. Increased nitrogen deposition could also affect the vegetation found in peat bogs as well as the carbon sequestration in this ecosystem. We measured nitrogen deposition and the net primary production of *Sphagnum* moss at 10 sites at varying distances to the oil sands extraction areas. We found that the oil sand activity has not had an effect on nitrogen deposition on bogs, and there was no relationship between nitrogen deposition and *Sphagnum* net primary production at these sites. From these data, it appears that large scale oil sands extraction has not had effects on pristine wetland boreal forest ecosystems.

Donald Hughes

Department of Sociology

A Theoretical Analysis of Crime Rates in Baltimore, Maryland in the Early 1990s

The purpose of this study is to examine the effects of social factors in determining community crime. It focuses on the disparity in crime rates within neighborhoods in Baltimore in the early 1990s. The study employs a multivariate analysis of neighborhoods, testing theoretical models of crime. Among the factors considered are ethnic heterogeneity, economic and residential stability, drug arrests, and the physical condition of the neighborhood. Next, the analysis supports the drug market model. Finally, it finds support for numerous factors of social disorganization theory. Most prominent are the absence of traditional mentors and role models, and the concentration of African Americans. The most significant framework is the Urban Disadvantage model. This framework contends that there is an urban concentration of racial/ethnic minorities, poverty, and crime.

Todd Marlo

Department of Animal Science

Evidence for Locally-Produced Prolactin in Equine Ovaries

Understanding the mechanism controlling seasonal anestrus is of importance to equine breeders. Foals that compete and are born closer to January 1 have an advantage to foals born later in the year. Our lab is currently investigating the role of prolactin during the Fall transition. Circulating prolactin concentrations decline in association with acyclicity. Our aim is to determine if prolactin could be produced locally within the ovary (from non-pituitary sources).

Ten ovaries were collected during summer 2007 for granulosa/theca and luteal tissues samples. Ovaries were collected from light horse mares post mortem. Granulosa/theca (n=20) and luteal samples (n=8) were frozen in liquid nitrogen until further processing. RNA extraction was performed for quantitative polymerase chain reaction analysis using primers and reaction conditions for equine preprolactin as described previously (Clark et al., Dom Anim Endo 24: 367-376). Equine pituitary mRNA was used for the generation of a standard curve. In a second experiment, ovaries were collected from light horse mares in the summer (n=6) and winter (n=5). Immunohistochemistry was performed by fixing tissues in 4% paraformaldehyde, embedded in paraffin and cut into 5 um sections. Tissue sections were incubated with R4 prolactin rabbit anti-porcine antibody (provided by D. Thompson, Louisiana State University) previously shown to detect equine prolactin. The secondary antibody was goat anti-rabbit IgG-biotinylated (avidin-biotin complex) developed with DAB chromagen-Ni and counterstained with nuclear fast red stain.

Equine preprolactin mRNA was detected in all samples. There was no difference in mRNA expression between sample types. There was a correlation in preprolactin concentration in granulosa/theca samples compared to follicle size ($P < 0.05$); granulosa/theca cells from larger follicles had fewer transcripts than smaller follicles. Histological preparations revealed prolactin staining associated with follicular, luteal, and vasculature structures. This evidence supports our hypothesis that prolactin is produced in equine ovaries.

Christopher M. Leffelman and Dr. Aldwin Anterola

Department of Plant Biology

*Effect of fatty acid supplementation on 1-octen-3-ol formation in the oyster mushroom *Pleurotus ostreatus* grown on a wheat straw substrate*

1-octen-3-ol is a major volatile compound produced by oyster mushrooms. This chemical is what gives mushrooms their characteristic "mushroomy" flavor and odor. 1-octen-3-ol is produced from linoleic acid via a proposed and uncharacterized hydroperoxide lyase that creates a 10-HPOD as an intermediate.

Mushrooms were fruited on wheat straw with eight different treatments and a control. Each treatment consisted of a fixed amount of various plant oils chosen for their differing composition of fatty acids mixed into the medium before sterilization. Mushrooms were then harvested, weighed, and prepared for GC/MS analysis using hexane as an extractant. Although there does seem to be some correlation in the harvested weight of mushrooms, there does not appear to be a significant difference in 1-octen-3-ol production in the treatments. It is unclear at this time if this is due to complete digestion of fatty acids as opposed to whole compound assimilation or if results were skewed by the signaling role of the volatile compound. For instance, it has been shown that 10-oxo-trans-8-decenoic acid plays a role in growth signaling in *Agaricus* spp. This is a compound produced in equal amounts to 1-octen-3-ol. If it does indeed serve a similar purpose in oyster mushrooms, it may actually up-regulate its own production. As cultures were not isolated from one another, this possibility cannot be ruled out.

Due to the agricultural and ecological importance of this mushroom, more study into these mechanisms should be pursued. A sequencing of the oyster mushroom *Pleurotus ostreatus* genome is proposed to be finished this year. This will facilitate much more in depth study of this organism.

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Help Seeking Attitudes amongst African-American College Students

Research suggests that African American college students are underutilizing mental health facilities (Chiang, Hunter, & Yeh, 2004). Reports propose numerous barriers that impact African Americans from seeking help, such as inadequate insurance coverage, lack of financial resources (Hung-Bin & Sedlacek, 2004), stigma association (Sullivan, Harris, Collado, & Chen, 2006), and mistrust of mental health professionals. The present study examines a sample of 104 African American college students at a Midwestern university. Using the Attitudes Toward Seeking Professional Psychological Help Scale (ATSPPH) and the Measurement of Acculturation Strategies for People of African Descent scale (MASPAD), I found the Assimilationist subscale was significantly related to help seeking attitudes.

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Investigation into the Effectiveness of Pyridoxine (Vitamin B6) Administration on Behavioral and Anatomical Outcome Following Unilateral CCI

Traumatic brain injury (TBI) can lead to debilitating sensory, motor and cognitive deficits in humans and animal models. Approximately 50,000 Americans suffered fatal outcomes following a head injury each year from 1989 to 1998. Unfortunately, these victims only account for 3.3% of all people who suffer from a TBI related event, many of whom will carry out the remainder of their existence at a reduced quality of life. Many pharmacological treatments which attenuate the post-injury sequelae have been investigated in animal models with some success. Despite these findings, no non-pharmacological or pharmacological treatment has been successfully translated into common clinical practice. Vita-nutrients attract investigative attention because they are “natural” compounds that, in general, exhibit less severe side effects compared to traditional pharmacological treatments. This experiment looked to evaluate the effectiveness of a new compound previously un-studied in conjunction with TBI, pyridoxine (Vitamin B6). Animals were assigned to one of four groups: 1) B6 (600mg/kg), 2) B6 (300mg/kg), 3) vehicle (saline 1ml/kg) and 4) uninjured shams. Animals were prepared with a 3mm unilateral controlled cortical impact (CCI) injury (+0.5mm anterior to bregma, -4.0mm lateral to midline) or sham surgery. Experimental groups were administered two 600mg/kg or 300mg/kg doses at 30 min and 24 hrs post-injury. Somatosensory dysfunction was evaluated with the vibrissae forelimb placing and bilateral tactile adhesive removal tasks. Sensorimotor dysfunction was evaluated with the locomotor placing and forelimb asymmetry tasks. Preliminary results indicate that B6 had a significant treatment effect for the 600mg/kg group and the 300mg/kg group in both the somatosensory and sensorimotor tasks. B6 was found to significantly improve behavioral outcome following injury and may be an exciting new vita-nutrient treatment for TBI.

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Kinetic and steric differences in adsorption in two porous metal-organic frameworks

Metal-organic frameworks, a new and rapidly expanding group of porous materials, are being studied for technical applications in gas storage, separation, and purification. The goal of this project was to study the gas kinetics and gas separation capacities for the metal-organic framework materials Copper Benzene-1,3,5-tricarboxylate (CuBTC) and $\text{Co}_3(\text{bpd})_3(\text{bpy}) \cdot 4\text{DMF} \cdot \text{H}_2\text{O}$, otherwise known as RPM-1-Co. Kinetic and steric differences are two of the three fundamental mechanisms underlying the use of adsorption in applications to gas mixture separation. Kinetic differences depend on differences in the time it takes for two species to adsorb on a surface and steric differences depend on the size and shape of the pores (essentially the substrate is used as a sieve).

We present the experimental results of kinetics and equilibrium adsorption measurements of tetrafluoromethane (CF_4) and argon on CuBTC and RPM-1-Co. The adsorbates display significant differences in their kinetics on RPM-1-Co (i.e. there are sizeable differences in the time required for each gas to reach equilibrium after it is allowed access to the substrate). We will compare our experimental results with predictions for how adsorption kinetics depends on the size of the adsorbate and on the sizes of the pores present in the substrate.