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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 reach.siuc.edu.

UNDERGRADUATE RESEARCH FORUM

ABSTRACTS • 2010



Southern
Illinois University
Carbondale

Student Center Ballrooms
March 26, 2010
Southern Illinois University Carbondale

“REACH enables SIUC undergraduate students to enrich their educational and career-preparation experiences by engaging in individualized research activities under the guidance of our talented faculty. Whether in the lab, studio or library, research activities teach fundamental problem-solving skills: learning how to ask important questions and finding answers to them. These skills are key to success in the “real world” and serve our students throughout their lives.”

—*Don S. Rice, Interim Provost and Vice 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 26, 2010
Southern Illinois University Carbondale

Program

Poster Judging Session: 8:30 a.m. – 12:30 p.m.

Public Viewing Session: 1:00 – 3:00 p.m.

Award Presentations: 3:00 p.m.

REACH Director

Meg Martin, ORDA

Organizer

Heather Russell, ORDA

Sponsors

Office of the Provost

Office of Research Development and Administration (ORDA)

SPEAR (Students Promoting Educational Advancement and Research)

Poster Judges

James Allen, Univ. Core Curriculum

Laurie Bell, Univ. Honors Program

Marjorie Brooks, Zoology

Philip Burke, Psychology

George Burruss, Criminology & C.J.

Joe Cheatwood, Anatomy

KyoHung Cho, Microbiology

Jennifer Dunn, Sociology

Buffy Ellsworth, Physiology

Eric Ferre, Geology

Ann Fischer, Psychology

Sally Gradle, Art & Design

Ed Heist, Zoology

Michael Hoane, Psychology

Jodi Huggenvik, Physiology

Eric Jacobs, Psychology

Karen Jones, Animal Science

Punit Kohli, Chem. & Biochem.

Derek Martin, Sociology

Walter Metz, Cinema & Photogr.

Michael Olson, Kinesiology

Regina Pfister, Dental Hygiene

Benjamin Rodriguez, Psychology

Antje Rusch, Microbiology

Deborah Seltzer-Kelly, C & I

Sedonia Sipes, Plant Biology

Brian Small, Fisheries and Illinois

Aquaculture

Sylvia Smith, Food & Nutrition

Don Sparling, Zoology

April Strader, Physiology

Jale Tezcan, C & E Engr.

Haibo Wang, E & C Engr.

Michael Young, Psychology

Special Thanks

John Koropchak, Prudence M. Rice, Don Rice and Julia Wetstein

STUDENT PARTICIPANTS / MENTORS

1. Misty Absher..... Stephanie Clancy Dollinger,
Paul E. Etcheverry
2. David William Addison..... Frances Harackiewicz
3. Ryan Babich*..... Sylvia Smith
4. Catrina Barber..... Morgan Chitiyo
5. Olivia Bateman..... Stephanie Clancy Dollinger,
Stephen Dollinger
6. Emily Berglin..... Kimberly Kempf-Leonard
7. Taylor Chance..... Philip Chu
8. Josh Chin*..... Matthew Schlesinger
9. Jessica Clayton, Katie Foerster... Deborah Bruns
10. Jeanette Coronado..... Kathy Hytten
11. Gregory Cresswell*..... John Martinko
12. Nicholas Defreitas..... Frank Anderson
13. Andrew J. Dennhardt..... Brooks Burr, Eric Hellgren
14. Justin Dewey*..... Erin Seekamp
15. Kirsten Eckstrum..... Brent Bany
16. Kimberly Elsenbroek..... Sara Baer
17. Darcy Ernat*..... Gregory Whitledge
18. Neil Eschmann*..... Boyd Goodson
19. Lindsey Beth Evans..... Sharon Peterson
20. Yuri Fedorovich..... Andrew Sharp
21. Dallas Flickinger..... Michael Lydy
22. Krymese Frazier*..... Peggy Stockdale
23. Eric Greenlee..... Matthew Schlesinger
24. Emily Haney,
Lindsay Holtmann..... Aaron Scott
25. Michael Harris, Sarah Harvey..... Kemal Akkaya
26. Jeremy Hartsock*..... Karen Renzaglia
27. Nichole Michelle Heinrichs..... Phil Anton
28. Justin Meredith Hennings..... Gabriela Perez-Alvarado
29. Samuel Hughes*..... Aldwin Anterola
30. Kelsey Elizabeth Jarrett..... Jodi Huggenvik
31. Tamara John..... Beverly Love
32. Cameron Jones..... Lizette Chevalier
33. Jordan Kabat..... Max Yen
34. Stacie A. Kula..... Stephanie Clancy Dollinger,
Ann R. Fischer
35. Bibi Aneesa Lehman..... Eric C. Ferre

[cont.]

36. Elizabeth Lombardi.....	Sharon Peterson
37. Steve Looten, Jr*	David Rush
38. Loran Luehr.....	Sharon Peterson
39. Misty McElyea.....	David Gibson
40. Wade Morrison,* Drake Caraker*	Walter Metz, Frank Stemper
41. Koleshcia Nelson.....	Paul Etcheverry
42. Kilby Osborn*.....	Gregory Rose
43. Erik Ostrowski.....	Jared M. Porter
44. Kendra Otto.....	Stephanie Clancy Dollinger, Lisabeth DiLalla
45. Sherrie L. Parks.....	Stephanie Clancy Dollinger
46. Elizabeth Patterson.....	Buffy Ellsworth
47. Felipe Pincheira.....	James Mathias
48. Sarah Pitcher.....	Michelle Miller
49. Charles Pugh*.....	Kelly Bender
50. Lucas Pulley*.....	Peter Filip & Dale Wittmer
51. Jimmy Sanders*.....	Matthew McCarroll
52. David B. Schwartz II.....	Buffy Ellsworth
53. Charles Scott.....	Brent Bany
54. Julia L. Sheffler.....	Stephanie Clancy Dollinger
55. J. Cray Shellenbarger.....	John Dobbins
56. Jarod Shelton*.....	Peter R. Patrylo
57. Alex Singleton.....	Justin Harrell
58. Malcolm Slack.....	Jim J. Musumeci
59. Lee Stewart.....	Scott Comporato
60. Jessica Stout.....	Joseph L. Cheatwood
61. Elora Voyles.....	Stephanie Clancy Dollinger, Joel T. Nadler
62. Tara Webb*	Michael Young
63. Sean Wheeler.....	Buck Hales
64. De'Angelo Williams.....	Jyotsna Kapur
65. Nefeteri Williams.....	Laura Dreuth Zeman
66. Ashley Wilson*.....	Laura Hatcher
67. Jessica Young*.....	Stephanie Clancy Dollinger, Lisabeth DiLalla

*Recipient of a 2009-10 Undergraduate Research/Creative Activity Award from the REACH Program

Misty D. Absher and Paul E. Etcheverry

Department of Psychology

Attachment Style and Emotional Intelligence: The Relationship between the Two

Within romantic relationships the emotional or attachment bond between partners can impact the quality and stability of that relationship. The attachment bond has been defined as containing an anxiety and avoidance dimension. Highly anxious individuals display hyper-vigilance for signs of a partner's lack of concern and responsiveness while highly avoidant individuals are more disinterested and emotionally distant from a partner. Both the anxiety and avoidance dimension are predictive of relationship satisfaction making it important to understand the predictors of the attachment dimensions. Emotional intelligence is the ability to perceive, regulate and utilize emotions in relationships. The current study also examined perceptions of a romantic partner's emotional intelligence as an influence on attachment dimensions. Emotional intelligence and perceived partner emotional intelligence were used in multiple regressions predicting anxiety and avoidance. In total, 108 (67 females and 41 males) introductory psychology students in romantic relationships completed an Emotional Intelligence Scale (WLEIS) and an attachment measure (ECR-R). In two separate multiple regressions Partner Emotional Intelligence was a negative predictor of Avoidance and Anxiety (Avoidance: $b = -.327$, $t = -2.891$, $p = .005$; Anxiety: $b = -.257$, $t = -2.250$, $p = .027$), respectively, while Emotional Intelligence was not a significant predictor (Avoidance: $b = -.055$, $t = -.488$, $p = .626$; Anxiety: $b = -.118$, $t = -1.029$, $p = .306$). Duration of the romantic relationship did not moderate the effect of Partner's Emotional Intelligence (Avoidance: $b = .048$, $t = -.497$, $p = .62$; Anxiety: $b = .018$, $t = .185$, $p = .854$) or Emotional Intelligence ($b = -.056$, $t = -.54$, $p = .586$; Anxiety: $b = .052$, $t = .496$, $p = .621$) on Avoidance or Anxiety. These results show that Partner Emotional Intelligence is predictive of both avoidant and anxiety dimensions.

What Students Say about Undergraduate Research:

"I was a C-average student in high school, but I've blossomed at SIUC," said McNair Scholar Miranda Griffith of her undergraduate research experience.

"This opportunity to do real research as an undergraduate has enforced in me that this is indeed what I want to do with my life." --Sara Reardon

"I have learned more from doing research than in any class I've taken. Hands-on learning stays with you much better than learning from lectures and books. Research is slow and frustrating but the rewards and excitement of discovering new scientific information are beyond anything I could have imagined. No matter what I do in life, I will always be able to use the tools of research, especially the critical-thinking and problem-solving skills that are essential for success." --Renee Lopez-Smith

"This experience confirmed my ability to tackle a large project and to meet a deadline, but more importantly I was able to participate in something I enjoyed and also educate the public about a growing problem in our waterways." --Matt Wegener

Louis Stokes Alliance for Minority Participation

SIUC is a member of the Illinois Louis Stokes Alliance for Minority Participation, a statewide coalition dedicated to increasing the number of underrepresented minority students in science, mathematics, and engineering. Funded by the National Science Foundation, this program provides paid, mentored research experiences for undergraduates on campus. *More Info: ilsamp.siu.edu.*

Undergraduate Assistantships

The Undergraduate Assistantship program, coordinated through the Financial Aid Office, provides on-campus, paraprofessional employment opportunities for full-time undergraduate students with a cumulative GPA of 2.25 or higher. Students are able to work directly with a faculty member or professional-level staff member in a position related to their academic discipline or prospective career. Students are paid on a salary basis and work 10, 15, or 20 hours per week. **A high percentage of assistantships entail working with faculty on research projects**, so this is an excellent option for students interested in research. For a listing of positions, see www.siu.edu/~fao/jobs/index.htm.

David W. Addison

Department of Electrical and Computer Engineering

Comparison of CST Simulated Results With Measured for DRAs

The accuracy of a simulation is a very important aspect. For RF engineering, it allows engineers to try new things faster by giving them the ability make small changes to their design and see the results nearly instantaneously. This research has two objectives. The first objective of this project is to quantitatively test the accuracy of CST Microwave Studio 2010 when used to simulate a dielectric resonator antenna (DRA) by comparing its results with those from a network analyzer. The designs used for this test are obtained from IEEE Xplore, and the results which are compared are the ones present in the papers of the designs tested (S11, gain, etc). The simulated results and the measured results found in the papers will be compared to each other (such as resonance frequency, bandwidth, directivity, etc). The research is the first part in a larger project which will explore the limits of DRAs. The second objective is to change the design from its original to make the simulated results match the measured. The data collected from these two objectives will be used to predict within what range of values around the simulated results will the true results be.

Ryan Babich and Dr. Sylvia Smith

Department of Animal Science, Food & Nutrition

Cradle to Grave: An Analysis of Sustainable Food Service Practices in a University Setting

The goal of this research was to understand the process of food service sustainability through a limited “cradle-to-grave” analysis of Southern Illinois University’s campus dining facilities. The process of researching the dining halls’ sustainability was broken into three separate stages: food mileage analysis, food waste analysis, and vermicomposting analysis.

The first stage examined the food mileage for each food item. Using a mileage calculator and a carbon footprint calculator, we were able to determine miles traveled and the amount of CO₂ produced by the university. Results showed that the dining halls were 15.67% sustainable in its food purchasing process. The goal for the university was to obtain a 20% purchase rate of sustainable products. The total carbon footprint for the university is 1538.06 tons of CO₂ for 1,990 items. The tonnage output is equivalent to the carbon emissions of 64,085.83 propane cylinders (carbonfund.org). The total mileage of the food items is 775,394.50 miles. With further investigation, the university will be able to find local producers which will increase the percentage of sustainability by reducing the CO₂ and mileage output.

The second stage of the research calculated the average amount of waste that was produced per student. SIUC’s dining halls utilize a new trayless system of service, where trays are removed and students have to fill up a plate instead of a tray. This analysis was performed on two separate days for each of the three serving periods to obtain a per student average. After the serving period had ended, the waste was gathered and weighed on a scale. The average food waste produced per student was 1.04 ounces a day. In 2007, the university’s recycling center conducted a plate waste study and calculated food waste to be approximately 4-ounces per person with trays. Currently, the waste produced is very limited. This demonstrates that trayless dining has proven effective and needs to be continued.

The final stage was a vermicomposting analysis in which a pre-composting phase was implemented to increase the amount of food waste that could be reduced within the university dining setting. The amount of time taken for vermicomposting to reduce the food waste was longer than anticipated. The longer time frame translated into additional monies to pay for utilities for the building and payroll for the workers. Vermicomposting, although ecologically friendly, does not appear cost effective.

This study demonstrates how universities can begin the process of sustainability. By using several methods that we have investigated to increase sustainability, food mileage calculations and tray-less dining, universities should be able to implement more sustainable practices in order to encourage making themselves green.

Undergraduate Research Opportunities at SIUC

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 reach.siu.edu. 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.

Saluki Research Rookies Program

This program, begun in fall 2008, provides funds on a competitive basis for high-achieving freshmen interested in conducting research and learning more about their intended major. Working with a faculty mentor, students plan a research project in fall semester to be carried out the following spring. Students receive a book allowance and earn a stipend if they successfully complete the program.

McNair Scholars Program

This federally funded program prepares undergraduates from underrepresented groups, including minority and first-generation/low-income students, for graduate school. It provides special learning experiences, GRE preparation services, and support. McNair Scholars take part in a summer research institute and present findings at a campus symposium and at conferences. *More Info: www.mcnair.siu.edu.*

Jessica Young

Department of Psychology and School of Medicine

Parenting Style as a Predictor of Early Onset Delinquency in Young Twins

Numerous studies have been conducted into the root cause of delinquent behaviors in order to determine appropriate preventative measures. Because it is so important to predict when delinquency is likely to occur, there has been a great interest in identifying factors that influence the onset of delinquency (Caspi et al., 1995; DiLalla, 2002; Moffitt, 1993; Mun et al., 2001). This research project explores the relationship between genes and environment in early onset delinquency by examining interactions between parents and twin children at ages 3, 4, and 5 and parent-reported delinquency at age 5. Specifically, it involved observing the prevalence of externalizing behaviors and behavioral noncompliance during interactions between parent and child. The study's first objective was to determine the heritability of early onset delinquency, as reported by the parent at age 5. The second was to use data collected from both the parent-child interactions and the parent reported data in order to determine possible environmental correlates of early-onset delinquency.

50 twin pairs were tested at ages 3, 4, and 5 years. Families engaged in a 10-minute interaction with one parent and both twins at each age, where the parent was told to work with the twins on a puzzle task. Parent and child behaviors coded from videotape included measures of problem discipline and parenting style for the parent and measures of aggression and responsiveness for the child. At age 5, parents completed the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) to assess children's delinquent behaviors.

Heritability of delinquency for the full sample was estimated at 60%. Intra-class correlations were conducted to determine whether early child behaviors during the parent-child interactions at ages 3 through 5 were predictive of 5-year-old delinquency. There was a significant correlation between aggression with sibling at age 5 and parent-rated delinquency at age 5 ($r = .45, p < .01$). A significant correlation was also found between more authoritative parenting at age 3 and less delinquency at age 5 ($r = -.28, p < .01$).

Early parenting and child aggression with siblings may predict early delinquent behaviors. This study furthers the research on risk factors of delinquency so that preventative measures can be implemented.

Catrina Barber

Department of Educational Psychology and Special Education

Autism in the Classroom: Exploring the Professional Development Needs of Teachers

Approximately 1 in 150 children representing various communities in the United States has an autism spectrum disorder (Autism Diagnosis, 2008). Most teachers will have at least one student with autism in their classroom during their career. However, many teachers will not have the necessary skills to provide appropriate and effective instruction to students with autism (Al-Shammari & Zaid, 2006). It is, therefore, necessary to provide effective professional development to teachers in order to help students with autism learn effectively. The purpose of the study was to explore the professional development needs of teachers who work with autistic students and to understand what challenges these teachers face. In this study, autism spectrum disorders were defined, concerns of teacher readiness to educate children with autism, and the research-to-practice gap were discussed. Data were collected through structured interviews. The participants in this study were four special education teachers. From the responses given by the participants, the study yielded important preliminary data that may help both teacher preparation and professional development personnel in designing effective programs.

Olivia J. Bateman and Dr. Stephen J. Dollinger

Department of Psychology

Psychopaths, Narcissists and Machiavellians: How Similar are their Possible Selves?

The purpose of this research was to examine whether Dark Triad personality traits relate to individuals' perceptions of their imagined futures. I hypothesized that all three Dark Triad traits (i.e., narcissism, Machiavellianism, psychopathy) would correlate positively with the rule and norm violating scale of the Imagined Futures Scale. I also predicted that narcissism would correlate positively with the agency and culture scales of the Imagined Futures Scale. And finally, I expected to see correlation patterns that would distinguish the three Dark Triad traits. One hundred and thirty-seven upper level psychology students at a large midwestern university completed the questionnaires. The MACH-IV and the Mach Revised positively correlated with the rule violating ($r = .25, .23$) and the threatening ($r = .20, .20$) subscales of the Imagined Futures Scale. Secondary psychopathy was also positively correlated with the threatening scale ($r = .32$), but not the rule violating scale ($r = .15$). Overall, the results of the current study indicated that the Dark Triad constructs are more different than they are similar.

Ashley Wilson

Department of Political Science

Neighborhood Tracks: Railroads and Construction of Space in Chicago 1887-1917

In the nineteenth century, the State of Illinois used legislation to empower the railroads through expansion of their businesses. This was accomplished through the use of land grants, and more importantly, eminent domain legislation. Eminent domain is the power of the state to take private property for public use. By analyzing primary documents, this project uncovers the relationship between state statutes and local ordinances that exercised eminent domain. Through the analysis, I provide the basis for evaluating how the laws contributed to the expansion of corporate power in the form of railroads. The railroad tracks eventually structured the neighborhoods in Chicago in significant ways. Therefore, the ways that communities are formed by their specific geographic locations in relation to land legislation was of concern. The research presented here contributes to our knowledge of the ways in which commercial enterprises and the government used power to take land, which not only benefited railroads, but also geographically and sociologically structured Chicago neighborhoods. Ultimately, this research contributes to the growing body of literature in critical legal geography and public law, which is concerned with understanding the formation of racialized spaces created through legal and political strategies.

Nefeteri Williams

School of Social Work

*Reconsidering Insurance Markets to Maximize Social Welfare:
Medicaid through Young Adult and Current Public Policy Frameworks*

This project examines the young adult risk pool in the market of health insurance through the analysis of data in the Illinois Medicaid handbook. In order to find a fit between young adult needs and Illinois Medicaid, we developed a framework of young adult needs merged with the proposed framework that President Obama and his administration developed to address current health care reform. Then, a content analysis of the Illinois Medicaid handbook allowed us to test out the framework. The findings disclose how young adults' needs can be met through current health care policies. Additionally, if policy changes occur, they should address the gaps in health care coverage that individuals already have.

Emily Berglin and Kimberly Kempf-Leonard

Department of Criminology & Criminal Justice

Comparing the Illinois & Missouri Juvenile Justice Systems

The first juvenile court was developed in Illinois in 1899 and served as the model for all others, making Illinois significant in understanding the development of juvenile justice systems. The current juvenile justice system in Illinois, however, is struggling. In contrast, the current juvenile justice system in Missouri is perceived as a model system. Illinois and Missouri are in close proximity, similar in terms of political structures, demographic composition, economic growth, and a mix of large cities and rural communities. Differences of the two juvenile justice systems have been examined.

This project relied chiefly on published information. There are many historical accounts of the origins of the Illinois juvenile justice system from which we have drawn information: (Platt, 1977; Bernard, 1992; Feld, 1999; Tanenhaus, 2005). The first hundred years of the Missouri juvenile justice system was recently chronicled by Douglas E. Abrams (2003). These historical publications and other literature we have obtained about the current systems have provided the foundation for this project. In addition, the current status of both systems has been explored through government documents. These sources have been supplemented with qualitative interviews with key informants from both states.

The objective is to inform people of the Illinois juvenile justice system and suggest how it can once again become a model system. The beginning idea of juvenile justice was that children needed to be protected from falling into a life of crime and delinquency, and the first juvenile court was established as a preventative system. What happened to change the perspective of the juvenile justice system? This research will advance policy recommendations, which I will work to disseminate to the appropriate audiences of politicians and justice officials who might best be able to implement our recommendations.

Taylor Chance

Department of Mechanical Engineering and Energy Processes

Exploring the Thermo-mechanical Behavior of Steel using Image Processing Techniques

Many people have studied thermal properties of materials and many have studied mechanical properties, but this project will do what is rarely done and study the connection between thermal properties and mechanical properties. By studying both of these properties, one can more easily predict the strain and stress that is put on a material, which is necessary to test products for efficiency. In order to understand the strain and stress, we will study the thermo-mechanical behavior of steel by experimenting with Digital Image Correlation (DIC) and Infrared Thermography (IRT). These techniques will help show the heat transfer inside of the material and how this heat transfer relates to the stress of the material under pressure. Also, to show accuracy, this project will compare how the results vary or relate to a Fundamental Element Analysis (FEA) computer-simulated model of the stress and strain of the steel. This project will help give an understanding of not only the thermo-mechanical properties of steel, but also the techniques used to show the inconsistencies in the steel. This project will help develop knowledge of how Digital Image Correlation and Infrared Thermography can be used and will show the strengths and weaknesses of each technique.

De'Angelo Williams

Department of Cinema & Photography

Who takes whom? Identity Politics against Institutional Power in Spike Lee's Bamboozled

This study analyzes Spike Lee's controversial film *Bamboozled* (2000) for its representation of race and class and evaluates the extent to which the film offers an alternative politics. I situate this analysis in the history of black representation in Hollywood, both at the level of authors and images. I discuss how Spike Lee resolves the tensions of being a black filmmaker in an industry primarily devoted to making profit, often at the expense of perpetuating racist and capitalistic ideology. This work, which is grounded in film/media history and critical-cultural theory, considers cinema as a historical artifact that can help explain the nature of power in society. I establish connections between Lee and previous generations of black filmmakers in order to understand the constraints and possibilities open to black filmmakers in the contemporary culture industry, where black film and television have merged as niche markets. My analysis is based in Marxist theories of culture. I find the film to be both a powerful confirmation and critique of postmodern culture: its protagonist, who sets off to manipulate the culture industry, ends up taking his own life. My analysis discusses *Bamboozled* from three perspectives: the consumption of blackface, African American self-commodification, and a victory (in the film) for the proletariat class over the bourgeois class.

Dale Buck Hales, Amanda Paulus, Sean Wheeler, Sarah Norton

Department of Physiology

Cyclooxygenase-1 Expression Co-localized with E-cadherin Expression in the Hen

Ovarian cancer is the fifth leading cause of cancer deaths among women. Early detection of the cancer is difficult due to the lack of symptoms presented in its beginning stages. Aside from the laying hen, no other animal spontaneously develops epithelial ovarian carcinoma (EOC) histologically similar to humans. E-cadherin is an adhesion protein that is typically down regulated in most cancers but up-regulated in ovarian cancer in the hen and human, further validating the use of the hen as a model. The up-regulation of E-cadherin is an early event in the development of the cancer. Cyclooxygenase (COX) is a rate-limiting enzyme in prostaglandin synthesis. COX-1 is up-regulated in ovarian cancer. Prostaglandins are acute inflammatory mediators that drive the progression of ovarian cancer. The objective of this study is to determine if the increase of COX-1 is correlated to the increased expression of E-cadherin.

The hens harvested were 30 month old White Leghorn hens. We performed Hematoxylin and Eosin and MASSON's Trichrome staining on the ovarian tissue to histologically identify cancer. Serial sections were subsequently stained for COX-1 and E-cadherin using immunohistochemistry (IHC).

Our findings indicate that COX-1 is expressed in the same pre-neoplastic and cancer tissues as E-cadherin. We hypothesize that co-localization by IHC will reveal that COX-1 and E-cadherin are expressed in the same cancer cells. The significance of COX-1 expression in the same cells as E-cadherin implicates prostaglandins as early mediators to the cancer.

Joshua Chin, Eric Greenlee and Dr. Matthew Schlesinger

Department of Psychology

Intermittent Vision Restores the Speed-Accuracy Tradeoff during Memory-Guided Tracking

Previous work in our lab has revealed an unexpected relation between tracking accuracy, target speed, and target visibility. In particular, tracking is more accurate for slow targets than for fast ones, when the target is visible (i.e., the speed-accuracy tradeoff). However, this pattern reverses when the target is occluded. In the current study, we hypothesized that providing brief visual samples of the occluded target would enhance memory for its location, and thereby restore the speed-accuracy tradeoff. Specifically, participants tracked moving targets under three vision conditions: (1) a visible target, (2) an occluded target, and (3) intermittent vision, during which an occluded target was briefly flashed during occlusion. Two major results emerged. First, tracking in the visible and occluded conditions replicated our early findings. Second, and more importantly, we found that intermittent vision of the occluded target restored the speed-accuracy tradeoff: participants in this condition were more accurate at tracking the slow target than the fast one. We highlight the implications of these findings for research in visual memory and motor skill.

Jessica Clayton and Katie Foerster

College of Education and Human Services

Examining Family Support and Feeding Needs of Children with Rare Trisomy Conditions

The Tracking Rare Incidence Syndromes (TRIS) project focuses on collecting data from parents with a child or young adult with a rare trisomy condition such as trisomy 18, 13 or 9. The TRIS Survey collects information about a variety of topics including medical issues, developmental progress, family support and feeding difficulties. Findings related to the final two topics have led to the development and dissemination of the TRIS Family, Friends and Finances Protocol and TRIS Feeding Protocol, respectively.

The TRIS Family, Friends and Finances Protocol explored the importance behind family support systems when involving a child with a rare trisomy condition (9, 13, and 18). Data indicated that various family members, both immediate and extended, play a range of roles when providing support for the immediate caregivers of a child with a rare trisomy syndrome. A commonality was found in that maternal grandmothers tended to be the most supportive members along with the child's father.

Due to the lack of knowledge in the area of feeding interventions for this population, TRIS project families have searched for solutions to address feeding difficulties and discover new methods to increase nutritional intake. Preliminary findings indicate reflux as a common concern, issues around acceptance of textured foods and the need for primary or supplemental tube feeding for many of the children. Several parents shared novel approaches to addressing these feeding problems including ideas for food presentation and creating specialized formula or solid food diets for their children.

Tara Webb and Dr. Michael Young

Department of Psychology

Waiting For a More Certain Future: Decision Making in a Video Game

A first-person-shooter video game was adapted for the study of probability discounting, in which an outcome decreases in value as its likelihood decreases, and delay discounting, in which an outcome decreases in value as the delay to its occurrence increases. This novel preparation was designed to address a criticism of previous research in the area. Discounting research using humans has been criticized for using hypothetical outcomes and tasks in which the probabilities and delays are not actually experienced. In the video game preparation, participants fired a weapon that could produce an explosion. The longer that they waited, the higher the likelihood that their weapon would function; after 10 seconds, pulling the trigger was guaranteed to produce an explosion. An impulsive person was predicted to shoot sooner with a greater risk of the weapon not firing, whereas a highly self-controlled person was predicted to shoot later in order to ensure a high probability of damage to the target. The advantages of waiting were systematically changed to either encourage or discourage waiting by modifying the way in which the probability increased. Participants who needed more encouragement to wait were judged to be more impulsive than those who waited without significant encouragement. Students also completed a typical probability discounting task, where they were asked to make hypothetical choices between smaller-certain versus larger-uncertain monetary rewards. There were significant individual differences in the task, and participants completed the task less efficiently than they did in an earlier experiment in which outcome magnitude, not probability, increased over time. Behaving impulsively in the video game was detrimental to the progress of the player, which produced less impulsive behavior as the game progressed. Future analyses will examine correlations between behavior in the video game and choices in the typical questionnaire task.

Elora Voyles, Stephanie Clancy Dollinger, Joel T. Nadler

Department of Psychology

The Perceived Value of a Potential Partner: Interest and Attachment Style

People attach higher value to objects upon learning others are interested in the object, even with valueless items such as parking spaces (Ruback & Juieng, 1997). This study examined the effects of outside interest on the perceived value of a person. To examine this phenomenon on the value of people instead of objects, participants watched one of two video scenarios using the same male target person (who was then rated on a variety of desirability traits). Two females within the videos either expressed interest or no interest towards the male target. This was the experimental manipulation (interested or uninterested). Additionally, attachment style of the female participants was measured to examine if there is a relationship between insecure attachment behaviors and value placed on potential romantic targets. Attachment style was calculated by figuring varying ratios of the characteristics avoidance and anxiety. The effects of attachment style and the condition were calculated in a between subjects ANOVA. There were main effects for condition $F(1, 105) = 22.8, p < .05$ and attachment style, $F(3, 105) = 4.61, p < .01$. In the interested condition, participants rated the male target more positively than in the not interested condition. Participants with a secure attachment style rated the male target more favorably in the uninterested condition than any of the other attachment styles. Most interestingly, all of the attachment styles rated the male target more positively in the interested condition, except for the dismissing attachment style participants, who were not impacted by the manipulation. This study demonstrated that attachment style influences the relationship as early as in the first moments of meeting. Also, the results of this study help explain the common complaint that “all of the good ones are taken” because the results of the study suggest that “taken” mates are perceived as more desirable.

Jeanette Coronado

Department of Foreign Languages and Literatures

The Experiences of Latinas in Graduate School

The purpose of this study was to explore factors that have contributed to the success of Latinas in higher education by looking at individual experiences as a means to identify key influences that motivated their success. Ultimately, the goal of the study was to provide insights that can enhance the experience of Latina/os in high education. Over a period of eight weeks, I interviewed seven Latina graduate students who were selected via internet solicitation and snowball sampling. After transcription, I coded and analyzed the interviews using concepts from Latino Critical Race Theory. Findings from the research provided three key themes attributed to the success of Latina women in higher education: obstacles/barriers, sponsorship/mentorship and tokenism. Obstacles/barriers and sponsorship/mentorship were the two most prevalent themes while the theme of tokenism was also established in the interviews. Findings from this research could help increase the future of Latina scholars.

Gregory Cresswell and Dr. John Martinko

Department of Microbiology

Modification and Stabilization of MHC Class I Molecules for Use in DNA Vaccines

Major Histocompatibility Complex class I molecules present antigens to the immune system. A mouse MHC class I gene was modified by linking individual subunits together with a peptide antigen. A disulfide bond, termed the disulfide trap, was added to stabilize the preloaded antigen. The original antigen peptide, SIINFEKL, was modified to test the disulfide trap for stabilization of MHC class I with a modified antigen. The SIINFEKL antigen was modified to SIINHEKL and SIINYEKL. DNA primers were designed to mutate the phenylalanine (F) amino acid to the new histidine (H) or tyrosine (Y). This was done through site directed mutagenesis, transformation, and transfection into tissue culture cells. Modifications of the peptide were tested using cytotoxic T cells that specifically recognized MHC I-SIINFEKL. Cells expressing the disulfide trap proved to be very stable and presented a recognizable antigen to the T cells even when the original peptide had been modified. For the SIINHEKL modification, the disulfide trap model was recognized by the T cells. However, the SIINHEKL without the disulfide trap model was weakly presented to the T cells. Flow cytometry of the tissue cultures showed very similar results. Flow cytometry uses antibodies specific for the MHC I molecule and the antigens being presented. This allows for proper folding of the antigen peptide on the MHC I to be detected. Molecules lacking the disulfide trap were not as stable and did not fold or present peptides well. The SIINYEKL molecule responded in much the same way. This serves as proof of the concept that peptides of our design can be presented efficiently to the immune system with disulfide trap stabilization. Further application of this research may allow DNA vaccines, expressing custom antigens, to be generated.

Jessica M. Stout and Joseph L. Cheatwood

Department of Anatomy

Effects of stroke on Nogo-A expression in the rat cerebral cortex

Current knowledge on post-stroke treatment has shown to be helpful, but is limited in its results. A recent breakthrough of a possible new treatment option for post-stroke patients is the use of anti-Nogo-A immunotherapy. Antibodies that bind to the Nogo-A protein impede its ability to inhibit neuronal remodeling after injury to the central nervous system, leading to increased plasticity and recovery in rats. The establishment of a timeline of Nogo-A mRNA expression can identify key time points at which therapeutic interventions designed to limit Nogo-A upregulation by a specific cellular population may best be applied. Previously we identified an upregulation of the Nogo-A protein in astrocytes in the peri-infarct cerebral cortex after stroke, indicating a potential increase in Nogo-A mRNA expression at the same time points. Therefore, we aimed to determine whether Nogo-A mRNA becomes upregulated by astrocytes in the peri-infarct rat cerebral cortex after stroke. To test this hypothesis, rats underwent a middle cerebral artery occlusion (MCAO), which resulted in a stroke lesion. We then performed fluorescent in situ hybridization to label Nogo-A mRNA, and coupled it with fluorescent anti-GFAP immunohistochemistry to identify astrocytes in the same sections. We quantified astrocyte Nogo-A mRNA expression in the perilesional cortex, using light microscopic techniques. No significant difference in the amount of astrocyte Nogo-A expression was evident between any time point examined (normal, 1, 3, 7, 14, or 27 days). This indicates a disconnect between Nogo-A mRNA expression and protein levels.

Lee Stewart and Dr. Scott Comparato

Department of Political Science

*Plea Bargaining, Sentencing, and Recidivism in Southern Illinois
Methamphetamine and Aggravated Sexual Cases*

This research addresses two crimes that have a major impact on the rural communities of southern Illinois, answering two questions that come to the root of prosecutorial and judicial philosophies. First, does plea bargaining increase the chances of recidivism in addictive crimes with traditionally high repeat-offender rates? Second, is it cost effective to plea bargain in cases with large chances of repeat offenses? The study statistically examines the relationship between plea bargaining and recidivism in methamphetamine and aggravated sexual crimes in 6 southern Illinois counties (Hamilton, Jackson, Jefferson, Pope, Union, and Williamson). The counties were chosen to supply a combination of semi-urban and rural areas to fully represent southern Illinois. Research was completed using a statistical analysis of court records obtained from Judici Legal Search Engine. The hypothesis of the study is that plea bargaining increases recidivism due to the fact that it inherently leads to lower sentences. The relationship between recidivism and such factors as age, sex, socio-economic status of defendants, sentence length, and sentence type have subsequently been examined. Further a cost analysis has been completed, comparing the costs of incarcerating a methamphetamine offender to the costs of allowing an individual to return to society and possibly repeat the offense.

Nicholas Defreitas

Department of Zoology

Examining the Phylogeny of Mesodon

Mesodon is a genus of large, common eastern North American land snails whose taxonomy and evolution are very poorly understood. The main goal of my project is to use genetic data to determine the pattern of evolutionary relationships (phylogeny) among all species of *Mesodon*. To this end, I have attempted to amplify and sequence regions of three mitochondrial genes (12S, 16S and cytochrome b) from DNA extracted from representatives of thirteen *Mesodon* species. To date, I have sequenced these gene regions from five species: *M. thyroidus*, *M. zaletus*, *M. elevatus*, *M. normalis*, and *M. sanus*. My analyses of these preliminary data suggest that four of these species are indeed fairly closely related, but *M. thyroidus* seems distantly related to the other species. These results have inspired a new goal of examining relationships among populations of *M. thyroidus*- to determine how much genetic variation is within this seemingly distant species, and additional *M. thyroidus* sequences may also help us recover the correct phylogeny for *Mesodon*. At present, I am still trying to sequence more genes from other species to put these preliminary data in better context. Unfortunately, other researchers have found *Mesodon* DNA to be difficult to amplify, and I have encountered similar problems. I have recently employed an additional method to purify the DNA that appears to substantially increase our DNA amplification success rate, and I am in the process of using this technique on additional DNA extracts to increase the size of my data set. These new data will be used to continue examining the phylogeny of *Mesodon*.

Andrew Dennhardt

Department of Zoology

Dispersal characteristics of an American raptor population: the peregrine falcon (Falco peregrinus) in the Midwestern United States

The main objective of the Midwest Peregrine Falcon Restoration Project (MPFRP) has been to recover and restore populations of peregrine falcons (*Falco peregrinus*) in the Midwestern United States. Due to heavy organochlorine use in the 1950s and 60s, historic cliff-nesting populations were extirpated and pushed to the edge of existence. With the help of the Endangered Species Act in 1972 and programs like the MPFRP, peregrine falcons have returned to viable population status in the American Midwest. Objectives of this research were to take a simple random sample of birds in a re-sighting database provided by the MPFRP, determine the number of falcons that had dispersed, calculate an average dispersal distance for each individual, and analyze trends in the population for statistical variance and significant differences. I found that mean dispersal distances for female peregrines were >2 times farther than males (226 vs. 107 km; $P < 0.001$). Results also showed that dispersal distances for hatched birds (mean = 201 km) did not differ from those of wild birds (mean = 159 km). Urban-born birds (mean = 171 km) and cliff-born birds (mean = 149 km) did not disperse different distances. These findings will benefit future studies of peregrine demographics and population viability analyses by providing wildlife biologists with valuable data about the trends, characteristics, and movements of peregrine falcons in the Midwest and in other regions.

Malcolm Slack

College of Business

An Examination of How College Students Received Financial Aid Information While They were in High School

The goal of this project was to find out if high schools are doing an effective job in providing high school students with financial aid information about college. Questions I looked at with this research were (1) Where and how do high schools obtain financial aid information? and (2) What could high schools and their guidance counselors do better to provide financial aid information to high schools students? The sample I used for my project was college students. I gathered the data by surveying 106 Southern Illinois University college students about their past experience of receiving financial aid while they were in high school.

Alex Singleton and Justin Harrell, PE

Department of Mechanical and Electrical Engineering

Boiler Dispatch Optimization

In 2008 alone, Southern Illinois University Carbondale (SIUC) spent \$1.6 million and \$430,000 in coal and natural gas costs respectively to provide heating, cooling and some electric power for the campus. SIUC spent an additional \$6 million in electric cost to supply the remaining electric need for the campus. The Physical Plant at SIUC operates a four-boiler system that burns coal and natural gas to produce steam that flows through over four miles of underground pipes to heat and cool the campus. A portion of the steam produced flows through a turbine-generator to produce electricity as a byproduct of the steam cycle. Unpredictable weather, boiler limitations, fluctuating fuel/utility costs, boiler maintenance, and boiler outages are all factors that drive up production cost. This research focused on the boiler system at SIUC with efforts to create a cost effective plan to help operate the boiler system and account for these factors. Research also included statistical analysis that determined whether the weather is the only factor that leads to the campus' steam need. Once all factors were accounted for, an all-inclusive, adaptable spreadsheet program was formulated. The program uses temperature forecast and historical data to predict the necessary steam production and determine an accurate hourly cost to operate. This information allows plant operators to develop a cost effective and adaptive plan to operate the boilers to meet the steam needs of the campus as conditions and fuel prices change. The program also helps increase total plant efficiency and electric production, making SIUC more self-sufficient. Use of the program has the potential to save over \$360,000 annually in comparison to 2008 production costs.

Justin Dewey

Department of Forestry

An Investigation of Southern Illinois Anglers' Beliefs and Practices Associated with Aquatic Invasive Species

A leading cause of biodiversity loss in many aquatic ecosystems is the introduction of invasive species. An invasive species is a non-native plant or animal deliberately or accidentally introduced into a new habitat that is able to reproduce and survive outside of the habitats where it evolved. The spread of invasive species in aquatic environments can have serious ecological and economic implications. Aquatic invasive species (AIS) may outcompete or displace native plant, fish, and invertebrate species, upsetting ecosystem function. Recreational boaters can spread AIS very easily from one body of water to another if they do not take proper precautions. If sport fish are affected, this may cause a loss in revenue brought to an area by recreational boaters and anglers. In order to better understand the actions needed to minimize the introduction and spread of AIS, this project's purpose is to assess anglers' knowledge and actions relating to AIS in southern Illinois through the collection of self-administered surveys. This project's survey built upon my faculty co-sponsor's March 2009 survey of registered boaters in the eleven county southern Illinois area. The survey that I administered utilized the information gathered from that initial registered boater survey to ask a more targeted subset of questions of a particular subpopulation of registered boater: the specialized angler. For the purpose of this survey specialized anglers are defined as bass club members, tournament anglers, and muskellunge anglers. The survey results will provide insight into specialized anglers' awareness of the presence of AIS, knowledge of the spread of AIS, and AIS control practices. This information will aid resource managers in the development of AIS control programs and education campaigns for recreational boaters and the general public.

Kirsten Eckstrum and Dr. Brent Bany

Department of Physiology

Cd137 Receptor is Expressed in a Subset of Uterine Natural Killer Cells of the Mouse Uterus and Trophoblast Cells of the Developing Placenta During Implantation

The tumor necrosis factor receptor superfamily member 9 (Tnfrsf9, also called Cd137) gene encodes a transmembrane protein (TNFRSF9) which binds to tumor necrosis factor superfamily member 9 (TNFSF9, also called CD137L) on adjacent cells. Currently nothing is known about Cd137 expression in the uterus during implantation. Thus, the aim of this study was to assess the mRNA levels and localization of Cd137 mRNA in the mouse uterus during implantation in the mouse. The mRNA levels of the two splice forms of Cd137 (transmembrane and secreted forms), as well as that of Cd137, were assessed by quantitative real-time polymerase chain reaction (qRT-PCR) methods. Cd137 mRNA was localized by in situ hybridization using dioxigenin-labeled riboprobes. The steady-state mRNA levels of Cd137 in the uterus were low on Day 4 of pregnancy, just before the onset of implantation. This significantly ($P < 0.01$) increased in the implantation sites of the uterus after the onset of implantation on Days 4.5-8.5 of pregnancy. Although levels also increased in the non-implantation sites of the uterus on days 4.5 and 5.5, the levels on Days 6.5 to 8.5 returned to the low level seen on Day 4. The levels of Cd137 mRNA were significantly greater in implantation compared to non-implantation segments of the uterus on Days 5.5-8.5 (2-, 33-, 71- and 92-fold, respectively). In wild type mice, Cd137 mRNA is found in the uterine natural killer cells and complete loss of uterine expression is seen in interleukin-15 knockout mice. Finally by Day 10 of pregnancy, Cd137 mRNA was localized to trophoblast cells of the developing placenta which was enhanced in the interleukin-15 knockout mice. In conclusion, during implantation Cd137 is expressed in the uNK and trophoblast cells of the endometrium and conceptus, respectively. This receptor may play an important role in uNK and trophoblast cell function in implantation.

Jarod Shelton, Lauren Macklin, Dr. Peter R. Patrylo

Department of Physiology

Assessment of the Effects of a Ketogenic Diet on Alzheimer's Disease Progression

Alzheimer's disease (AD) is an age-associated, progressive neurodegenerative disease that is common in the US, affecting up to <50% of people between 75 to 84 years of age. Serious concern has been raised for a treatment of AD, mostly due to the rapidly increasing number of elderly in the U.S. Action must be taken to avoid a serious health and economic crisis that will occur from the increasing cost of housing and care for individuals stricken with AD. Pathologically, AD is characterized by the accumulation of senile plaques, dystrophic neurites, and neurofibrillar tangles; neuronal death and cognitive decline result from this increasing accumulation. It has been hypothesized that administration of a high fat, low carbohydrate diet (ketogenic diet) reduces the debilitating effects associated with AD, although the mechanism involved in this pathological reduction has yet to be discovered. This study assessed the possibility of using a ketogenic diet as a safe alternative towards the administration of AD.

To study the effects of a ketogenic diet on AD progression, mouse models of AD were aged and fed a ketogenic diet for ~19 months. Amyloid plaque deposition, hyperphosphorylated tau accumulation, insulin levels, and ketone body levels were gathered from the aged animals. Data analysis of the experimental results is currently being conducted to deduce a correlational significance between AD progression and ketone body metabolism, which may indicate a possible mechanism linking the use of a ketogenic diet and AD.

J. Cray Shellenbarger

School of Architecture

Structural Laminated Bamboo

The primary purpose of this project was to explore the structural properties and possible application of laminated bamboo products. Much like glue laminated timbers, laminated bamboo is formed from several smaller pieces to make up conventional dimensional structural elements. The major difference is the growth rate of bamboo. Bamboo grows very quickly and has the unique ability to be harvested without total loss of the plant. When compared to a tree which takes years to grow and is harvested once, bamboo is far more sustainable.

We began with the detail drawings for connections and assemblies, which were noted in English as well as in Spanish because many of the primary growing areas are primarily Spanish speaking. The next step was to develop design aids from the data obtained in testing. These design aids would be very similar to the National Design Specification for Wood Construction developed by the American Wood Council. The calculations included in these tables were based on the each member's geometry as well as the individual bamboo species. Currently we are working with only two species of bamboo: Calcutta Bamboo and Moso Bamboo. The results of this project will include a preliminary design aid for the structural application of bamboo. These will express the members in bending, compression and tension. The detail documents and a revised material specification will also be provided.

Kimberly F. Elsenbroek, Elizabeth M. Bach and Sara G. Baer

Department of Plant Biology

*Ecotypic Responses of Indiangrass (*Sorghastrum nutans*) to Varying Water Regimes*

Tallgrass prairie is widely restored throughout the Midwest, USA; however, there are uncertainties about the sustainability of restoration success under shifts in precipitation. Because native C₄ grasses account for the majority of productivity in restored grasslands, understanding dominant prairie grass response to precipitation change is needed to identify which ecotypes should be used in restoration under different climate scenarios. We tested whether source populations of a dominant prairie grass, *Sorghastrum nutans* (Indiangrass), collected from across the precipitation gradient of tallgrass prairie respond differentially to watering treatments in a common soil and under controlled conditions in a greenhouse. Source populations or "ecotypes" of *S. nutans* originated from Illinois, Konza Prairie, and Hays, Kansas. We also created a "mixed ecotype" treatment using a combination of all 3 source populations. Three plants were grown in each pot and exposed to three watering levels (approximately 300, 600, and 900 mm) over a 12 week period. Each source × watering treatment was replicated 5 times (n=60). Photosynthesis was measured with a Li-Cor 6400. At the end of the 12 weeks, we quantified aboveground, belowground, and total net primary production (ANPP, BNPP and NPP) in each pot.

Ecotypic variation in physiological performance and productivity of *Sorghastrum nutans* from the different source populations occurred in the common soil and controlled environment. Net photosynthesis varied among the source populations regardless of watering treatment ($P = 0.009$). Both Kansas sources of *S. nutans* exhibited higher rates of photosynthesis than Illinois plants. All productivity measurements revealed an interaction between source and watering treatment. Differences in ANPP among the sources were greatest in the 600 mm watering treatment, whereas there were no differences in ANPP in the 900 mm water treatment ($P = 0.033$). Greatest variation in BNPP and NPP among the ecotypes occurred in the 300 and 600 mm watering treatments ($P < 0.03$). Both BNPP and NPP were similar among all sources in the 900 mm watering treatment. Overall production did not increase with an increase in water supply as predicted. Interestingly, the "mixed ecotype" pots showed no variation productivity across the varying watering regimes. These results suggest that combining ecotypes of a dominant grass may stabilize productivity under a wider range of precipitation regimes, but field tests that include more inter-specific interactions are needed to predict whole ecosystem response.

Darcy Ernat and Gregory Whitledge

Department of Zoology

Stable isotopic indicators of population structure and natal habitats of Asian carps threatening to invade the Great Lakes

Understanding early-life habitats is crucial for managing non-indigenous large river fishes such as silver carp that are threatening to invade the Great Lakes and may significantly impact economically valuable Great Lakes fisheries. Silver carp inhabiting the upper Illinois River directly below the electrical deterrent barrier (installed on a canal in the Chicago area that connects the Illinois River with Lake Michigan) possess the greatest potential to invade the Great Lakes. However, adult silver carp inhabiting this reach of the Illinois River may have originated from many points throughout the Mississippi River basin (e.g., Illinois River or Middle Mississippi River), and the relative importance of these potential origination locations is unknown. As such, this study was used to identify natal habitats of adult silver carp in the upper portion of the Illinois River. Based on the stable oxygen and stable carbon isotopes of otoliths (earstones) from individual fish, we have determined that silver carp inhabiting the area below the electric barrier originated from within the Illinois River itself, the Middle Mississippi River, and floodplain lakes along the lower Illinois River valley. Because of the geographically widespread points of origin for individual fish, management efforts for eradication or control of silver carp in the upper Illinois River should be directed at a similarly broad geographic scale. While potentially challenging to implement, large-scale removal of silver carp and the closely related bighead carp in the Illinois and Mississippi Rivers could greatly reduce the probability of these species breaching the electrical barriers and entering the Great Lakes.

Julia Sheffler and Stephanie Clancy Dollinger

Department of Psychology

Adults in Community Residences and Assisted Living Facilities: Relations between Well-Being and Personality

The number of assisted living facilities for older adults has more than doubled over the last twenty years and has presented older adults an additional living option by providing assistance (e.g., health care) in a less restrictive environment than that found in a nursing home facility. The purpose of this research was to examine the psychological well-being of 20 older adults living in their own homes and 20 older adults living in an assisted living facility. By examining these two groups of older adults, we hoped to better understand how these two types of living environments contribute to quality, well-being, independence and choice in the lives of older adults. A semi-structured interview was administered to explore the daily lives of the participants in a directed, yet conversational manner. This method allowed the participants to express specific, detailed information relevant to the study (including their preferred activities, hobbies). The older adults were also administered the NEO-FFI (Costa & McCrae, 1992), the Rand Health Survey (SF-36), the Geriatric Depression Scale (GDS), the Mini-Mental Status Exam (MMSE) and the Scales of Well-Being (Ryff, 1989). Preliminary results indicate a positive relation between several of the variables (e.g., health, depression, activities, self-acceptance, autonomy, conscientiousness, and extraversion).

Charles Scott and Dr. Brent M. Bany

Department of Physiology

Tissue-Specific Hand2 Deletion Causes a Defect in Ovarian Development and/or Function in Mice

The *Hand2* gene plays major roles in development. When the gene is deleted, the embryo dies during pregnancy so traditional knockout methods cannot be used to study *Hand2* function in the adult. However, when deleted from specific reproductive tissues, we have found *Hand2* plays a key role in uterine and ovarian function. The purpose of the work presented here is to describe the ovarian phenotype of mice where *Hand2* alleles were deleted using *Hand2* “floxed” (LoxP) mice crossed with progesterone receptor (*Pgr*) cre-recombinase “knockin” (*Cre*) mice. As expected the adult male *Hand2^{LoxP}/LoxPPgr^{cre}/wt* (*Hand2^d/d*) mice showed no phenotype and were completely unaffected by the gene deletion. However, the mature *Hand2^d/d* female mice were completely infertile but looked healthy. Histological examination revealed that immature 21 day old *Hand2^d/d* mice show drastically lower overall numbers but same proportion of each follicle type when compared with the control (*Hand2^{LoxP/LoxP}Pgr^{w/wt}*) mice of the same age. Similar findings were seen 48 h after PMSG injection in mature mice with exception that the *Hand2^{d/d}* mice showed fewer pre-ovulatory follicles and corpora lutea compared to controls. After mating, no cumulus oocyte complexes or blastocysts could be recovered from the oviduct and uterus on days 1.5 and 3.5, respectively. Further, after superovulation, only 2-3 cumulus-oocyte complexes or blastocysts could be recovered from the oviduct and uterus on days 1.5 and 3.5 in *Hand2^{d/d}* mice, respectively (controls 15-30). Close histological examination of Periodic Acid Schiff stained ovarian sections from mature *Hand2^{d/d}* mice revealed the presence of many empty zona remnants while none were found in those of control mice. Finally, estrous cycle monitoring revealed that *Hand2^{d/d}* mice were in a continuous estrous-proestrous cycle unlike the controls that exhibited all four phases. In conclusion, we suspect *Hand2* may play a key role in ovarian development/physiology.

Neil A. Eschmann and Boyd M. Goodson

Department of Chemistry and Biochemistry

Generating Laser Polarized Xenon via Spin-Exchange Optical Pumping: Using Cesium vs. Rubidium as the Alkali Metal

Because of their great detection sensitivity, “hyperpolarized” noble gases (e.g., ³He, ⁸³Kr, and ¹²⁹Xe) have found increasing use in a number of NMR/MRI applications—ranging from the imaging of human lungs and other tissues to probing molecules and materials. The best method for creating hyperpolarized gases like ¹²⁹Xe is spin-exchange optical pumping (SEOP); SEOP involves the transfer of polarization from circularly-polarized light to the electronic spins of an alkali metal, which in turn is transferred to the nuclear spins of the ¹²⁹Xe. Rubidium (Rb) metal has typically been used as the alkali metal due to its many advantages, including a large spin-exchange cross-section (which relates to the likelihood of spin-polarization during a given gas-phase collision). However, cesium (Cs) could have significant advantages over Rb for SEOP. For example, it has been predicted that the Cs/¹²⁹Xe spin exchange cross section should be about twice that of Rb/¹²⁹Xe and the spin-destruction cross-section (which reflects the rate at which alkali metal polarization is lost) is estimated to be half that of Rb/¹²⁹Xe. Yet until now, Cs has not been widely used. One reason has been the lack of high-power light sources capable of exciting Cs at the right absorption wavelengths. This limitation has stalled the ability to compare the two methods of preparing hyperpolarized ¹²⁹Xe. I will report on our initial efforts to generate hyperpolarized ¹²⁹Xe with Cs. Through a collaboration, we have recently acquired two novel high-power (>40 W) laser diode arrays (LDAs) that are capable of hitting the Cs absorption lines (at 894.3 and 852.1 nm). After evaluating these lasers and optimizing our procedures, these lasers should allow a direct comparison between Rb/¹²⁹Xe and Cs/¹²⁹Xe SEOP. Furthermore, preliminary studies for each optical excitation will be reported such as how the xenon polarization will depend on various experimental parameters.

Lindsey Evans, Sharon Peterson and Afroza Hasin

Department of Food and Nutrition

Opinions of Students at Southern Illinois University on the Subject of Breastfeeding

Women who become mothers while attending college face a unique set of barriers with regards to breastfeeding. This research involved a two-part study. The purpose of the first study was to examine the general opinions of college students (n=250) on breastfeeding. Students visiting the student center on campus were asked to fill out a 5-question written survey. A second retrospective study, which involved a one-page written survey, was administered in person to members of a single parents' organization affiliated with SIUC. This research was conducted to determine reasons why mothers (n=11) who are currently attending SIUC chose to breast or bottle-feed, and identify resources that would have made it easier for them to breastfeed while in school.

Results of the first study revealed a significant correlation between gender and public breastfeeding, indicating that women reported more negative opinions compared to men ($r=0.188$, $p=0.003$). Another significant correlation was observed between public breastfeeding and designated breastfeeding areas ($r=0.333$, $p=0.000$), meaning that those students who believe women should not breastfeed in public also believe there should be designated breastfeeding areas. Results of the second study revealed 91% of participants felt there is a need for more basic breastfeeding education, 90% also indicated a need for designated breastfeeding areas on campus, and 60% reported a need for greater social acceptance and support among college students. According to the research conducted, there is a looming need for breastfeeding education and designated breastfeeding areas on campus. The introduction of these resources could alleviate a college mother's struggle with regards to breastfeeding.

David Schwartz and Dr. Buffy Ellsworth

Department of Physiology

FOXP3 is Required for Normal Reproductive Function in Males

The pituitary gland is essential for normal reproductive function. It relays signals from the hypothalamus to many organs in the body; therefore it helps regulate many functions such as growth and development, and reproduction.

Transcription factors play a major role in development at all embryonic stages. Transcription factors bind to specific sites on DNA, and help to "turn on" and "turn off" genes. Transcription factors are crucial in determining the identity of cells during embryonic development and in the adult.

FOXP3 is a transcription factor. Mutations in *FOXP3* have been shown to cause autoimmunity in humans. The form of autoimmunity found with mutations in the *FOXP3* gene is immunodysregulation polyendocrinopathy enteropathy X-linked syndrome, or IPEX. IPEX is the attack of the body's immune system against its own organ tissues. The common symptoms of IPEX are hypothyroidism, insulin-dependent diabetes, anemia, and eczema.

Mice with mutations in *Foxp3* (*Foxp3^{sf/y}*; scurfy mice) are also autoimmune. Males are hypogonadal and sterile. They begin to have scaly skin around two weeks old, and most die after weaning. Scurfy mice have been shown to have a reduced level of luteinizing hormone (LH). LH is essential for testosterone production; therefore, Scurfy mice could be hypogonadal and infertile due to low levels of LH secretion.

In order to distinguish whether low testosterone is a result of a primary testicular defect, or if it is caused by a primary pituitary defect, I plan to inject both scurfy and wild type mice with hCG and oLH. After injection, the seminal vesicles will be weighed as an indicator of testosterone production. Testicular testosterone levels will then be measured using a testosterone assay. Both of these tests will be performed on *Foxp3* scurfy mice, and their normal littermates. I have optimized the amounts and timing of hCG and oLH by injecting normal mice at 3 weeks of age. I will use this treatment paradigm for treating the *Foxp3* scurfy mice.

James Sanders and Dr. Matthew McCarroll

Department of Chemistry and Biochemistry

Molecular Modeling of Enantioselective Molecular Interactions

Chiral molecules play an important factor in our daily lives. Chiral molecules have two forms which are called either an R or S enantiomer. Enantiomers are mirror image stereoisomers that cannot be super imposed on each other. The study of enantioselectivity is important because chiral molecules are used in many of our pharmaceutical drugs. The affect one enantiomer may have on a person may cure a disease, but the other enantiomer may cause death, so the separation of enantiomers is critical for drug preparation. Because enantiomers are stereoisomers of each other, they are extremely difficult to identify and separate through the most common chemical techniques used today. The method I am using to determine the enantioselectivity of molecules is done through molecular modeling. I create a model of the enantiomer and of the chiral selector and analyze the energy between their interaction using a computer program called Gaussian. This is done for the pair of enantiomers. Ideally through the change in energy it will be possible to use this experimental technique to identify likely chiral selectors without the need for expensive trial and error.

Yuri Fedorovich and Andrew Sharp

Departments of Anatomy and Physiology

Effect of Pyridoxine on Sensory and Motor Axons of Chicken Embryo

Pyridoxine (Vitamin B₆) is an essential organic compound for proper development and function of the nervous system. However, there are many studies indicating that overdose of pyridoxine causes large fiber neuropathy in mammals predominated by proprioceptive (Ia) muscle sensory neurons. Yet no clear evidence exists for why large fibers are dying. We hypothesize that pyridoxine selectively kills large diameter axons by disruption of a biochemical pathway intrinsic to this subset of neurons. Therefore, we anticipate these neurons will undergo programmed cell death (apoptosis) as opposed to a general necrotic process.

We selected chicken embryos as our subjects due to their similarities of neuronal development processes with humans and easy excess without altering a parent. Embryos were injected at day 7 and 8 (E7 and E8, respectively). The control group received 100 μ l of physiological saline, while experimental group received solution of 3.45mg of pyridoxine per 100 μ l of physiological saline. Spinal columns were collected at E8 and E9 for immuno-histochemistry and peripheral nerves at E13 for Electron Microscopy (EM). Since we hypothesize that neurons will undergo apoptosis, we used immuno-histochemistry to detect activated Caspase-3, an indicator of apoptosis in neurons of the dorsal root ganglia. We found that treated animals had a larger number of apoptotic cells compared to the control group. EM was preformed to investigate the change in size of nerves and the number of axons in a nerve. From thick sections during the preparation for the EM, there were already indications that muscle innervating nerves decreased in size, while skin innervating nerves showed no change in diameter. These data support our hypothesis; however, EM to determine the number of axons in each nerve still must be completed.

In the future, pyridoxine could be used as a tool for studies of nervous system development by specifically killing large diameter sensory neurons.

Dallas L. Flickinger, Amanda D. Harwood, and Michael J. Lydy

Fisheries and Illinois Aquaculture Center, Department of Zoology

Assessing the bioavailability of the insecticide permethrin on Daphnia magna

Due to increased restrictions on other insecticides and their low mammalian toxicity, the use of pyrethroid insecticides has been increasing in the past few decades. This has led to extensive research on the prevalence and potential toxicity of these insecticides. Pyrethroid insecticides have been detected in sediments at levels lethal to aquatic invertebrates in several studies, permethrin being among these pyrethroids. While the majority of research has focused on sediments, due to the hydrophobicity of pyrethroids, a recent study also found concentrations in waste water effluents at levels lethal to invertebrates. This indicates a need to also assess bioavailability and toxicity in water column species such as *Daphnia magna*. A new method for rapidly assessing bioavailability and toxicity in sediments and water is the use of solid phase microextraction (SPME) fibers. The concentrations derived from SPME fibers have been correlated to internal residues in several aquatic species for a variety of chemicals in previous studies and may be considered a better estimate of bioavailability than whole matrix (sediment or water) concentrations. The objectives of this project were to demonstrate a relationship between SPME fiber concentrations and toxicity as well as SPME fiber concentrations and bioavailability (expressed as internal residues). Establishing this relationship between SPME fibers, bioavailability, and toxicity could subsequently lead to the use of SPME fibers to evaluate potential risk to aquatic species from aqueous exposure.

Lucas Pulley

Department of Mechanical Engineering and Energy Processes

Comparison of Intermetallic-Bonded Diamond Composites and Polycrystalline Diamond Compacts

Intermetallic-Bonded Diamond composites (IBDs) represent a ground breaking new group of materials patented in 2007 by two SIUC faculty. IBDs consist of diamond and carbide phases embedded into an intermetallic Ni₃Al matrix, which can be further alloyed by additional elements such as Mo, B, Ti, W, Fe, Cr, Zr and others. Polycrystalline Diamond Compacts (PDCs), one of today's industry-leading materials, consist of diamond crystallites held together by Co-alloy. Both the IBDs and PDCs are designed for "high wear" applications with necessary resistance of tools such as in coal mining, machining of materials, oil drilling and others. IBD has a cutting capacity and wear resistance far exceeding current cemented tungsten carbide materials. In previous research, a series of specifically designed IBD composites have been found to exceed the standards of toughness and wear resistance in mining and oil drilling applications, but no systematic research has been done to compare the friction, wear, and toughness properties of IBDs and PDCs. This research project compared selected properties and performance levels of IBD and PDC samples. During impact testing, samples were subjected to impact energies of up to 125 J in order to examine the fundamental differences in the fracture mechanisms using Scanning Electron Microscopy. During friction and wear testing, sample edges were pressed against rotating discs of cast iron, steel, and granite in order to analyze and compare the mechanisms of friction and wear of IBDs and PDCs. Results show that PDCs outperform IBDs in "smooth wear" testing, but IBD is superior in impact resistance and "impact wear" testing. Several industries are currently interested in licensing this promising new material, and this research is a key component for the future applications of IBDs.

Charles Pugh¹, Y.T. Segid², P.T. Behum³, L. Lefticariu^{2,3}, A. S. Burns¹, and K.S. Bender¹

¹Department of Microbiology, Southern Illinois University Carbondale

²Department of Geology, Southern Illinois University Carbondale

³Environmental Resources and Policy Program, Southern Illinois University Carbondale

Community Analysis of the Acid Mine Drainage from an Abandoned Tab Simco Coal Mine

Contamination of surface and ground waters with heavy metals from acid mine drainage (AMD) is a major concern in areas that contain abandoned coal mines such as Southern Illinois. As such, a bioreactor has been constructed at the Tab Simco mine near Giant City State Park to promote the activity of sulfate-reducing bacteria (SRB). The metabolic processes of SRB can result in metal sulfide precipitates, which can easily be removed from the system. The main objective of this project was to determine the effectiveness of the current bioreactor design by performing a molecular analysis of the bacterial community present in various regions of the site. This analysis was performed by targeting the 16S rRNA (present in all bacteria) and *dsrAB* (specific for SRB) genes through amplification, cloning, and DNA sequencing. Resulting data indicated that the surface of the AMD pretreatment pond consisted almost exclusively of iron-oxidizing bacteria along with algae and iron-reducing bacteria. The main seep from the holding pond into the bioreactor contained phylotypes similar to *Acidithiobacillus ferrooxidans*, an organism able to couple the oxidation of sulfur with reduction of ferric iron. This metabolism is predicted to counteract the desired SRB metabolism. While the bioreactor appeared to be successful in raising the pH of the site and stimulating bacteria capable of utilizing the added carbon source, the predominant phylotype was related to the sulfur oxidizer *Sulfuricurvum kujiense*, thus indicating that any sulfur reduced in the bioreactor may be re-oxidized and unable to precipitate metals. Analysis of the *dsrAB* genes revealed the presence of SRB type organisms in both the bioreactor outlet and the post-treatment pond, indicating that sulfate reduction may be stimulated by the bioreactor but at presumably low levels. This data will be used to propose bioreactor design changes to inhibit competing metabolisms and optimize sulfate reduction.

Krymese Frazier and Dr. Peggy Stockdale

Department of Psychology

Construct validation of the sexually harassing activities questionnaire

Stockdale and Berry (2009) developed the Sexually Harassing Activities Questionnaire (SHAQ) to assess the range of sexually harassing behaviors in which some individuals engage. This proposal seeks to validate the SHAQ by assessing its usefulness for both working and student populations and to examine hypothesized relationships with gender, sexist attitudes, motives and organizational contexts (Cronbach and Meehl, 1955). If validated, the SHAQ will be the first of its kind to accurately measure sexual harassment perpetration and can be used for both theoretical and practical purposes. The results of this study could potentially provide construct validity to the new Sexually Harassing Activities Questionnaire (Stockdale and Berry, 2009). The unique approach of this scale is the fact that it assesses an individual's common behaviors through self-report and determines if the person engages (either knowingly or unknowingly) in sexually harassing behaviors. To our knowledge, this would be the first time a measure of sexual harassment will be used that measures these behaviors from the perspective of the "initiator" as opposed to the perception of the "victim." The end result of this project could greatly impact the field of industrial/organizational psychology, clinical psychology, human resources, personnel management and even criminology. It may allow us to better understand how and why sexual harassment occurs. Presumably, if an individual is unknowingly engaging in sexually harassing behaviors, as assessed by this new scale, we can then educate the person and encourage behavior modification prior to the individual being accused of acting inappropriately. By assessing the same behaviors using standardized scales of sexual harassment, I hope to be able to provide the much needed construct validity for this new scale.

Eric Greenlee and Matthew Schlesinger

Department of Psychology

Dual Task Interference of Object Representations

Feature Integration Theory proposes that when attention is directed toward an object in the environment, a cognitive copy, or representation, is created. This object-representation acts as a temporary reference for all information relating to the original object. The process of referring to object-representations has been proposed as an explanation for why humans are more quickly able to verify that an object is the same as one they have seen before than they are to state that the object has changed. The current study examined the effect of concurrent secondary tasks on this preview benefit. Specifically, based on evidence that object-representation utilizes primarily the dorsal visual pathway, it was hypothesized that reaction times would be increased to a greater degree when the secondary task was designed to recruit dorsal, rather than ventral, visual processing resources. The results of this investigation will be presented and the implications will be discussed.

Sarah Pitcher

Department of Sociology

Secondary Victim Advocates in the Latino Community: A Qualitative Test of the Ecological Model of Victim Advocacy

This project explores the roles of workers serving as secondary advocates, i.e., those who operate as peripheral staff, in regard to domestic violence issues in the Latino community in Southern Illinois. Interviews with key members of the Latino community were conducted in order to examine the interactions that take place among secondary advocates, victims, and support networks. Interview data revealed that some of the particular characteristics that hinder advocacy, as well as those that facilitate advocacy in some way, can be understood using an ecological model to explain advocates' interactions. The examination of intervention patterns—including relational strategies between advocate and victim—and advocates' roles in the community reveals the most readily available and most utilized resources in the domestic violence support network for this population. These are primarily informal advocates who are both socially and physically close victims of the community, along with several culturally-specific obstacles, such as communication barriers and the effect of the cultural value placed on family. Cultural resistance to help-seeking behavior, based mainly on specific fears, reduced the utilization of government-based help resources. These fears often revolved around legal status concerns, but also a culturally learned rejection of law-based intervention. Implications for more effective advocacy include more bilingual workers who are culturally sensitive, as well as a larger support network that works with secondary advocates and helps accommodate victims' primary needs more comprehensively.

Felipe Pincheira

Department of Mechanical Engineering

Thermodynamic and Sensitivity Analyses for Cogeneration Plant Improvements

Cogeneration intends to maximize the overall exergetic efficiency of power cycles by applying the basic principle of matching source to end use. Instead of releasing the waste heat from power generation to the outside environment without obtaining further benefits, this technology utilizes the by-product as useful thermal energy. At Southern Illinois University Carbondale (SIUC), Boiler 5 takes advantage of this application by producing high pressure steam to generate electricity before it gets distributed on campus for heating and cooling purposes. By this means, SIUC generates around 16 million kWh annually, equivalent to roughly 16% of the total power consumption. Although this is an important offset to the cost of SIUC's annual consumption of electricity, greater benefits can be obtained from the implementation of an effective facility improvement design.

The purpose of this research was to determine the feasibility of replacing the existing high pressure turbine at the boiler plant with an extraction/condensing turbine, as well as changing the steam turbines at the chiller plant by electric motors with Variable Frequency Drives (VFDs). Three design alternatives were compared to the existing system by performing thermodynamic analyses and estimating the cost savings. The factors considered in these estimations were the amount of electricity generated, the amount of electricity required by the electric motors, additional tons of coal, and a potential cap-and-trade policy. Further, a sensitivity analysis was conducted for the alternative showing the greatest benefits in order to rank the importance of three independent variables.

The final results indicate that by implementing the suggested changes of the proposal and running Boiler 5 steadily at 87% of maximum load, can save as much as \$1,370,042 annually. From the sensitivity analysis, it has been concluded that the variables with the greatest impact on cost savings are the steam flow, the isentropic efficiency of the new turbine, and the efficiency of the electric motors, in decreasing order respectively.

Emily Haney, Lindsay Holtman and Aaron Scott

Communication Design, School of Art and Design

Student Recreation Center Environmental Graphics Redevelopment

The Student Recreation Center is a popular place for students, faculty, alumni, and community members to workout, socialize, compete, and most importantly stay fit. We have conducted research to make the Student Recreation Center a more welcoming atmosphere that is modern and unified. Within our research, we discovered the Recreation Center had an inconsistent, outdated, and intimidating look. Over time, we developed universal icons and guidelines to be used for all signage throughout the building. There is consistent size, color, font, material, location, and standards for this signage system all determined by traffic flow, and demographics.

Overall, we hope to apply our research to renovate the Student Recreation Center. The use of the new signage system will allow navigation to be less intimidating for new members and students. By placing the signs in a consistent manner at decision points throughout the Student Recreation Center, members and guests will have no trouble finding their way. Not only did we research and design a consistent and unified signage system but also we chose between different types of signs whether it is hung, protruding, or freestanding and what would be more effective. By renovating the Student Recreation Center, it will become less confusing and more welcoming.

Michael Harris, Sarah Harvey and Dr. Kemal Akkaya

Department of Computer Science

Dynamic Channel Switching in IEEE 802.11 Wireless LAN's

IEEE 802.11b WiFi devices operate in the 2.4 GHz ISM band in the United States. Because of this, 802.11b devices are susceptible to interference from a multitude of other devices on the same frequency, such as microwave ovens and cordless phones, leading to transmission failures and degraded performance. Wireless devices may be configured to communicate on different channels at different times as necessary to mitigate the effects of interference. However, the determination of the best possible channel at any given time, and the act of channel switching, introduces a delay. This delay can lead to certain transport-level protocols failing and restarting (i.e. TCP streams timing out, thus disconnecting). Furthermore, the 802.11b protocol does not specify a mechanism by which channel switching may be coordinated between communicating devices. Without such a mechanism, communication would be interrupted until both devices are again communicating on the same channel. We propose the design of a protocol by which channel switching behavior may be coordinated between communicating 802.11b devices. This protocol will be implemented using open source drivers on Linux, and specifically target devices with drivers that work with the new mac80211 subsystem present in the Linux kernel. We will measure the overhead incurred by channel switching and suggest methods by which this effect may be mitigated.

Elizabeth Patterson and Buffy Ellsworth

Department of Physiology

Foxd1 and Its Role in Pituitary Morphology during Embryonic Development

Foxd1 is a forkhead transcription factor that is important for development of the kidney and optic nerve. During development, Foxd1 is expressed in the mesenchyme surrounding the pituitary. This mesenchyme is a source of growth factors, such as bone morphogenetic protein (BMP), which is essential for normal pituitary development. We observe that while Foxd1 deficient embryos (Foxd1lacz/lacz) produce adrenocorticotrophic hormone, thyroid stimulating hormone and glycoprotein hormone α -subunit, a developmental delay at age e10.5 and dysmorphology at e14.5 and e16.5 are apparent. These abnormalities are consistent with abnormal BMP signaling. Therefore, I hypothesize that Foxd1 is important for proper signaling of BMPs in the mesenchyme surrounding the pituitary gland, and ultimately normal pituitary development. To test this hypothesis, I propose to stain for the phosphorylated form of SMAD1, SMAD5, and SMAD8 (PSMAD) and Noggin. BMP signaling results in phosphorylation of SMADS 1, 5, 8; thus, the presence of phosphorylated SMAD1, 5 or 8 serves as an indicator of BMP signaling. In Foxd1lacz/lacz embryos, BMP signaling occurs ectopically in the kidney. I expect phosphorylation of the transcription factors SMAD1, 5, 8 will be increased in Foxd1 deficient embryos due to increased BMP signaling. It is anticipated that expression of Noggin, a BMP inhibitor, will be significantly reduced in Foxd1 deficient embryos.

Sherrie L. Parks and Stephanie Clancy Dollinger

Department of Psychology

Personality Exposed: The Use of Photographs to Explore Extraversion and Openness in Older Adults

Photographs have been used as a research tool with a variety of methodologies (e.g., autophotography) and populations (e.g., college students, homeless adults, immigrants) to examine areas such as identity, self esteem and personality traits. The current study used photographs to examine personality and explore the lives of older adults in a retirement community. Sixty-two older adults took photographs of their daily activities to complete a photograph diary over four weeks. They were encouraged to take at least one photograph a day. The photographs were coded based on a rating system developed specifically for this study. Older adults were also administered the NEO-FFI, the Rand Health Survey (SF-36), the Geriatric Depression Scale (GDS) and the Mini-Mental Status Exam (MMSE). Extraversion scores and the number of photographs designated by the coders as a reflection of “Openness” (e.g., number of photographs of travel, number of photographs of group meals) were positively related. A positive relation between Extraversion scores and the number of photos designated as “Extraversion” indicators (e.g., number of photographs with others, number of photographs displaying positive emotions) was observed for men only. The results indicated that photographs of daily living may reflect, to some degree, the facets of individual personality traits. Future studies should examine gender differences and develop additional activity categories of photographs for each factor of the NEO-FFI.

Jeremy Hartsock and Karen Renzaglia

Department of Plant Biology

Do flagella of land plant sperm have outer dynein?

Cilia and flagella are found in all major groups of organisms except fungi, slime molds, red algae and flowering plants. These organelles are responsible for cell motility, ranging from whole unicellular or colonial organisms to sperm cells of animals and plants. The axoneme, or core of the flagellum, is a highly specialized and conserved array of microtubules responsible for the movement of cilia and flagella. The axoneme contains scores of proteins that are necessary for motility and the axonemes of most organisms are equipped with two kinds of motor protein complexes described as inner and outer dynein (Kamiya, 2002).

It was not until additional plant genomes were sequenced very recently, that a comprehensive analysis of the evolution of outer dynein could be conducted. Bioinformatics analyses of the *Physcomitrella* moss genome identify the presence of outer dynein orthologs, which were previously thought to be absent among bryophytes. This new knowledge suggests that these proteins are retained in early land plants within the axonemes of their flagellated sperm cells. Moreover, examination of flagella in the moss *Physcomitrella* have revealed unknown dark regions around the outer edges of “A” microtubules. In order to determine if these unknown dark regions are in fact outer dynein, immunogold-labeling coupled with observation under the TEM were conducted. These methods have revealed outer dynein labels in both the moss *Physcomitrella patens* and the leafy liverwort *Calypogeia*. Observations were corroborated by examination of the sperm cells of *Chara*, the green algal ancestor of land plants that has outer dynein. Labeling in this alga yielded similar binding frequencies and location as those observed in the two bryophytes.

Nichole Heinrichs and Dr. Phil Anton

Department of Kinesiology

The Physiological and Psychological Effects of Implementing and Exercise Program to Cancer Survivors: A Case Study Review of a Cancer Survivor

This is a case study of a 55 y/o female cancer patient. She was diagnosed with stage II breast cancer in her left breast in 2006. The subject underwent a lumpectomy and ancillary node removal on the left side. Her adjuvant chemotherapy cancer treatment consisted of three stages: 1) four treatments of 5FU Ellence Cytotan (10/6/06 – 12/08/06); 2) four treatments of Taxotere (12/29/06 – 3/2/07); 3) fifty-two treatments of Herceptin (1/2/07 – 12/31/07). To facilitate the delivery of chemotherapy, a port-a-catheter was inserted. During the port-a-catheter insertion surgery, she suffered a collapsed left lung, a punctured right lung and internal bleeding. She underwent emergency surgery two days later.

The subject enrolled in the Strong Survivors Exercise and Nutrition Program the fall of 2008. Subject was able to complete the program, but was only able to attend the exercise sessions once a week instead of the recommended twice a week. Subject participated in a fitness assessment at the beginning and end of the 12-week program and experienced noticeable gains in some assessment areas (lift and carry and sit to stand task improvement), but was lacking in other areas (balance).

The subject returned to the program in the fall of 2009 (Survivors Forever). She noted the inability to ride her motorcycle with her husband and friends (a major impact on her quality of life). She lacked upper body strength and endurance and was no longer able to manage the weight of the bike. The subject has consistently exercised with a cancer exercise specialist two days a week for one hour and is now able to ride her motorcycle consistently. The subject has been reassessed twice since returning to the program and similar fitness results have been noted.

Kendra Otto and Dr. Lisabeth DiLalla

Department of Psychology

Early Environmental Predictors of Preschoolers' Prosocial Behaviors with Peers and Siblings at Age 5

A better understanding of how prosocial behaviors develop in the initial years of life will aid adults in successfully helping children develop the skills they will need to succeed in social settings. This study investigated whether or not children's positive interactions with their parents and daycare quality at age four were associated with children's prosocial behaviors at age five measured as cooperation with their co-twin and prosocial interactions with unfamiliar peers. The present sample consisted of 55 twin pairs (boys = 49, girls = 61) tested at ages four and five; twin 2 for each pair was used as a replication sample. At age four, the participants engaged in a parent-child triadic puzzle task with their parent and co-twin. At age five, all participants engaged in a triadic interaction similar to that at age four and 19 twin pairs also engaged in a peer play interaction with an unfamiliar, same-age, same-sex peer. At this time, families also completed a questionnaire indicating whether their children received childcare and, if so, the quality of childcare their children had experienced. Results for the twin 1 sample revealed a positive relation between authoritative parenting and children's responsiveness at both ages, $r(53) = .33, p < .05$ at age four and $r(52) = .71, p < .001$ at age five. Thus, more authoritative parenting was related to more responsive behaviors of the children. Behaviors were marginally stable across ages four and five. Cooperation with one's sibling at age five was marginally significantly predicted by age four interaction behaviors, $F(3,51)=2.49, p < .08$. Specifically, child responsiveness at age four (Beta=.33, $p < .05$) and minutes of authoritative parenting at age four (Beta=.38, $p < .06$) were significant predictors of cooperation. Therefore, these results suggest that parenting style and child responsiveness are influential factors in developing prosocial behaviors, such as cooperation.

Erik J. Ostrowski and Dr. Jared M. Porter

Department of Kinesiology

The Effects of Self-Regulated Practice on Bilateral Transfer

It has been consistently demonstrated that providing individuals the opportunity to contribute to the creation of their practice environment results in enhanced learning and motor skill performance. Much of this evidence comes from education based research; however, this learning phenomenon has more recently been demonstrated in cognitive psychology and motor skill learning situations. However, many questions remain about the generalizability of these findings. Better understanding the generalizations of this phenomenon has direct implications for physical therapy, occupational therapy and various other rehabilitative occupations where the learning or relearning of motor skills is critical. Thus, the purpose of this study was to expand the generalizations of previous findings. Participants were divided into two groups. The first group was given instructions allowing them to choose the order in which they practiced a novel task. A second group of participants were not given the opportunity to choose their practice schedule; rather, they followed a set order of practice trials. Although the results of this study were not consistent with all of the predicted results, they do provide initial evidence suggesting that allowing participants to contribute to the creation of their practice schedule does facilitate the learning of novel motor skills. The results of this experiment are far reaching. These findings suggest that the psychological ability of choice makes significant contributions to enhancing human performance. These findings further suggest that practitioners should allow their patients to contribute to the creation of their practice; simply doing this will improve their motor skill performance.

Justin M. Hennings and Gabriela C. Pérez-Alvarado

Department of Chemistry & Biochemistry

The Interaction between Afadin and LMO7 at Adherens Junctions

In Adherens Junctions throughout the body, there is a relationship between the proteins l-Afadin and the LIM domain only protein 7 (LMO7), primarily in epithelial tissues.¹ L-Afadin is a protein that directly interacts with Nectin, an important Cell Adhesion Molecule (CAM), and connects it to a group of cytoplasmic proteins that link Nectin to the Cadherin homo-trans dimer complexes forming the Adherens Junctions. The LIM domain within LMO7 is able to bind to a region of l-Afadin and indirectly link it to the cadherin-catenin complex through another cytoplasmic protein known as alpha-actinin.¹ Considering this known interaction between Afadin and LMO7, it is extremely important to begin researching the exact protein domain of Afadin that binds to the LIM domain of LMO7 using a variety of biochemical laboratory procedures. It is also significant to determine the secondary structure and, in turn, tertiary structure of this domain in Afadin using a technique known as Nuclear Magnetic Resonance (NMR) spectroscopy to allow for a detailed picture of the mechanisms behind the binding of l-Afadin to LMO7. During cancer metastasis, LMO7 is over-expressed and localized to the sites of cell-adhesion.² In the nucleus, LMO7 functions as a transcription factor and has been implicated in tumor suppression.³⁻⁴ How these functions play an overall role in the interaction between Afadin and LMO7 will ideally be determined through the structural research that is currently being performed on these two proteins.

1. Ooshio et al. (2004) *J. Biol. Chem.* 279, 31365-31373.
2. Kang et al. (2000) *Cancer Res.* 60, 5296-5302.
3. Holaska et al. (2006) *Hum. Mol. Genet.* 15, 3459-3472.
4. Tanaka-Okamoto et al. (2009) *Cancer Sci.* 100, 608-616.

Samuel Hughes¹ and Aldwin Anterola²

¹Department of Physiology and ²Department of Plant Biology

Taxol Precursor Production in Physcomitrella patens

Taxol is a cancer fighting drug that was initially isolated from the Pacific Yew. However, the isolation process is not very efficient and the tree is being excessively harvested and faces extinction. To synthetically make Taxol is inefficient and costly. If the precursor taxadiene-5 alpha-acetoxy-10 beta-ol can be produced with ease, then the synthetic modification of that precursor would be an efficient way to produce the potent cancer fighting drug. Several genes from the Pacific Yew were isolated and amplified so that they could be inserted into the moss *Physcomitrella patens*. Using competent *E. coli* cells as entry vectors, the genes were transferred so that the metabolic pathway responsible for taxadiene-5 alpha-acetoxy-10 beta-ol synthesis could be replicated in *Physcomitrella patens*. When the final transfer was made to the moss, a transient expression of the genes resulted in small amounts of product being obtained. After gas chromatography mass spectrometry analysis, the chromatogram plots showed a few more promising peaks representing other Taxol precursors. With a permanent transfer to the moss, a much larger sample could be analyzed and a more Taxol precursor could be produced.

Kilby P. Osborn IV

Center for Integrated Research in Cognitive & Neural Sciences

Memory Testing in Rat Models of Type I and Type II Diabetes

Diabetes mellitus (DM) has become a major and growing health concern. The number of Americans suffering with DM has tripled in the last twenty years, and the average age of individuals developing DM, especially Type II (insulin resistant form), has decreased significantly. Among the problems that have been associated with DM is cognitive decline. The goal here was to examine the effects of the induction of DM on memory.

Male Long-Evans rats were trained in a delayed match-to place (DMP) version of the Morris water maze. The advantage of using this task was that the animals had to learn and remember something new each time they were tested. After good initial performance was achieved, some rats were treated with streptozotocin to destroy insulin-producing cells in the pancreas and induce Type I DM. Other rats were placed on a high-fat diet, with or without streptozotocin treatment, to induce insulin resistance and Type II DM. Appropriate control groups were included for both conditions. Body weights, blood glucose and insulin levels were monitored, and insulin resistance was evaluated in the Type II animals.

All rats continued to be evaluated in the DMP task at monthly intervals. Type I rats did not develop memory impairments, even at 12 weeks after treatment. These animals could not be tested at longer intervals due to morbidity. Type II rats first showed memory impairments 8 weeks after being placed on the high-fat diet. This deficit was not affected by streptozotocin treatment. This pattern of results would suggest that the loss of insulin receptor function was more important than the loss of insulin itself for developing memory impairments with DM. Alternatively, oxidative stress induced by the high fat diet could potentially be an underlying cause of damage to the memory centers of the brain.

Koleschia Nelson

Department of Psychology

Watching What You Say: The Contents of Disclosure to Friends about Romantic Relationships

This study is an interview-based analysis of romantic relationship disclosure. This project examined the content of romantic relationship disclosure between a member of a romantic relationship and a friend, with specific focus on the type and accuracy of the information presented. Structured interviews were conducted. The interviewee pool was comprised of eight students of a Midwestern university who were involved at the time of the interview in a romantic relationship. Participants were asked a structured set of questions inquiring about the types and accuracy of information they disclosed to a particular friend. Results show that participants disclosed eight types of information, including positive disclosures—which include events and relationship characteristics—and negative disclosures—which include relationship problems and getting married. All participants reported being partially inaccurate at least some of the time. Findings suggest individuals in romantic relationships attempt to manage friend perceptions by filtering information during acts of disclosure to members in their social networks.

Kelsey E. Jarrett¹, Dr. Philip J. Jensik², Dr. Michael W. Collard², and Dr. Jodi I. Huggenvik²

¹Department of Microbiology and ²Department of Physiology

Primary Mouse Embryo Fibroblasts (MEF) with Targeted Disruption of Deaf1 have Reduced Apoptotic Response to Ultra Violet Radiation

Deformed Epidermal Autoregulatory Factor 1 (DEAF1) is a protein that is widely expressed in adult tissues and required for development in the embryo. DEAF1 is a transcription factor that may regulate expression of serotonin receptors in the brain and dysregulation has been linked to suicide and depression. DEAF1 interacts with proteins responsible for apoptosis and DNA repair. Preliminary evidence suggests DEAF1 may interact with or regulate expression of p53, a tumor suppressor that controls signaling pathways responsible for DNA repair and apoptosis. Our lab has established a mouse line with targeted disruption of the Deaf1 gene. Mice with homozygous knockout of DEAF1 have neural tube defects and die at birth. In order to investigate the biochemical effects of DEAF1 homozygous deletion in cells, mouse embryo fibroblasts (MEF) were prepared from E12.5 day old embryos. MEF were genotyped via DNA isolation and polymerase chain reaction for the normal and null Deaf1 alleles. Early cell passages of DEAF-1 +/+, +/-, and -/- cells were used for experiments. Genotoxic stressors, such as H₂O₂, hydroxyurea, and ultraviolet light were used to produce DNA damage and apoptosis. Potential changes in the cell cycle due to Deaf1 genotype or genotoxic stress were monitored by flow cytometry. Immunofluorescence was used to examine the localization of p53 and cytoskeletal proteins within MEF and a caspase 3/7 assay was used to measure apoptosis. We concluded that MEF with homozygous loss of Deaf1 have reduced apoptosis in response to ultraviolet radiation.

Tamera John

Department of Radio & Television

Black Male Stereotypes in Modern American Film: A Content Analysis

This project investigates the extent to which Hollywood continues to use three predominant historical archetypes—the Buck, the Coon, and the Tom (Bogle, 2001)—when casting black males in contemporary films. The study critically examines the 2008 blockbuster film *Hancock*, starring actor Will Smith, a well known black actor. A qualitative analysis approach was used to identify and interpret the film in order to ascertain whether traits of the three archetypes historically played by black males are present in modern day cinema. The analysis supports that negative images of black males are still prevalent in today's films. These images are harmful and reinforce racial and cultural stereotypes, thus perpetuating negative feelings and fear of black males. As this study demonstrates, it is important to continue to examine film in order to make positive changes for the future.

Wade Morrison and Drake Caraker

Department of Cinema and Photography and Department of Music

Thorns: Documentary Visual Aesthetics and Modernist Musical Influences in a Formalist Film Narrative

Our goal in this project was to create a film aesthetic that, to our knowledge, had never been fully explored before in the classical framework of a narrative film. This new aesthetic consisted of two interlocking aesthetic goals: The full incorporation of a documentary aesthetic into the formalist narrative, the narrative undermining of the Hollywood vigilante story, and the use of modernist music to replace the traditional pseudoclassical score.

The incorporation of a documentary aesthetic includes framing the entire narrative as a fictional documentary. This extends to the writing of the film, the choice of shots and editing styles, and even the inclusion of actual documentary into the film. During the shooting of the film, we shot short, real “on the street” style interviews, presenting the interviewees with a condensed form of the film's narrative (the common tale of a father becomes a vigilante after his daughter is killed) and then asking for their reactions and/or thoughts as if the events were real. We then edit some of these interviews seamlessly alongside the fictional, “in-script” interviews. This infuses the moral and ethical arguments at work in the film with a wider view than just those of the creators.

The use of modernist music—which focusses purely on emotional content rather than traditional melodies and rhythms and has for some reason been traditionally shunned by both corporate and independent film—should also increase the emotional impact of the film. This combination of techniques is extraordinarily new to filmmaking, and to our knowledge has not yet been used in a realistic drama other at the time of the project's proposal.

Misty D. McElyea, David J. Gibson and Matt Geisler

Department of Plant Biology

Competition and Drought Responses in Switchgrass (Panicum virgatum)

Intraspecific competition is competition between individuals within the same species. Preliminary work in *Arabidopsis thaliana* suggested that under water stress, the response to competition turns off abiotic stress genes. A follow-up experiment was conducted to assess the morphological response of *P. virgatum* to intraspecific competition, and how competition and water stress integrate. Seedlings of *P. virgatum* cv 'Cave-in-Rock' were grown in 48 pots at three density levels (low, medium, and high) in a growth chamber under two different moisture regimes, with eight replications per treatment combination. Plants in 30 of the pots were harvested after 95 days to allow RNA extraction for gene expression analysis. RNA quality control was assessed and gene expression will be determined using the corn gene chip microarray. Over the course of the experiment, the number of tillers per seedling was recorded. After 89 days, final measurements were made of seedlings in each pot including: plant number, tiller number, leaf chlorosis, and height. The greatest percentage of leaves showing chlorosis occurred in the high density, wet treatment; however, the growth of seedlings at this density was the highest. Seedlings in the low density treatment had the largest number of leaves per plant, but there were more leaves per pot in the medium density treatment. The highest number of tillers per pot occurred in the high density treatment. The height of 10 tillers per pot was measured and wet pots and high density pots had the tallest tillers. Wet outperformed dry, and high density did the best out of the three densities. The results of this experiment show that drought stress exacerbates the effects of competitive stress under high density conditions.

Cameron Jones, Dr. Lizette Chevalier

Department of Civil and Environmental Engineering

Visualization of Nanomaterials in Aqueous Environment

In industry the drive to better the product and beat the competition has fueled the invention and use of automobiles, printing presses and computers. When science figured out how to create nanoparticles, industry jumped at the possibility to create materials for everything from clothing to computer chips. Though impacts of these new materials are not known, the market continues to grow. Analysts estimate that the market will reach \$10 billion by 2012.

Research on the impacts of nanomaterials on the environment has not kept pace with the manufacturing sector. The objective of this research is to develop a method for visualizing nanomaterials in the environment. Specifically, the investigation will consider nanoparticles used to coat brakes and the reaction to water. Brake pads are coated in an effort to suppress the heat creating fire, for noise reduction and to improve braking. To capture the relationships between particles, a Leica phase contrast light microscope and an Hitachi S570 SEM operating at 20 kV accelerating voltage were used. Photographs were taken at different magnifications and varying locations within the sample. Both wet and dry samples were examined under the darkphase light microscopy while a dry and a dried wet sample were coated with 40 nm Pd/Au alloy and examined using the electron microscope.

Jordan Kabat and Dr. Max Yen

Material Technology Center

Analysis of Surface Topography for the Fabrication of Nanotechnology

Carbon nanotubes are vital in the continued development of technology, benefitting specifically the biomedical, electronic, and infrastructural industries. With great electrical conductivity properties, as well as a very high strength-volume ratio, they are considered to be the material of the future. The problem that has arisen with carbon nanotubes is their expense, due to the slow process to create them. The current fabrication techniques produce a very small quantity under very restricted, ideal conditions. As the demand for carbon nanotubes increases, the current fabrication technique will not be sufficient.

The purpose of this research is to examine the effect of surface gradient on the growth of carbon nanotubes. Two different control groups are used. One group is extensively polished to create a smoother surface, while the other group will be left unpolished. The polishing will create smaller ridges on the surface, but these ridges will be potentially tailorable for desired surface patterns. The unpolished surface will have the original surface, which will contain larger ridges, but arbitrarily distributed. The hypothesis is that the smaller but more patterned ridges will create more areas for the carbon atoms to reside. Thus, the fabrication of the carbon nanotubes will be more plentiful for the smaller ridges. The results of the fabrication will prove which surface is more advantageous for carbon nanotube growth: polished or unpolished. The answer to this question will provide one additional way to speed up the fabrication process.

Loran Luehr and Dr. Sharon Peterson

Department of Animal Science, Food and Nutrition

Snacking score and type of lunch among low-income Caucasian children at risk for Type 2 Diabetes

The risk of Type 2 Diabetes (T2DM) among American adolescents is rapidly increasing. Teaching children about high-nutrient food choices is important because in today's environment they are constantly surrounded by low-nutrient high calorie foods. To fully understand eating patterns of adolescents who are at risk for T2DM, an assessment of their snacking and meal patterns must be completed. This study examined adolescents' type of lunch and snacking patterns using a snacking score (a number calculated by quantifying their reported low-nutrient and high-nutrient snack choices).

Written questionnaires were given to low-income Caucasian children (n=18) who had at least two risk factors for T2DM. These questionnaires were distributed as part of the "R. U. A. Healthy Kid?" program, a community based intervention targeting adolescents at risk for T2DM. Interesting results were found regarding snacking patterns. Low-nutrient snacks such as fruit drinks and French fries were frequent snack choices (reported by at least two-thirds of participants). High-nutrient snacks such as yogurt cups, fresh vegetables, fresh fruit, water, and 100% fruit juice were frequently consumed also. The comparison of type of lunch and snacking scores did not produce statistically significant differences most likely due to small sample size. However, interesting preliminary results should be reexamined in a larger sample size. For example, children who reported eating school lunch exclusively had lower "high-nutrient" and lower "low-nutrient" snacking scores. Children who reported eating either school lunch or bringing a lunch from home had a slightly lower total snacking score, potentially indicating healthier snacking patterns overall.

Determining children's lunch and snacking patterns can be used to understand the type of food choices that adolescents are making which leads to awareness of the need for nutrition education. Further studies examining motives related to type of lunch and snack choices including adolescents' preferences should be taken into consideration.

Steve Looten, Jr.

Department of Theater

Loss of Innocence: A Live Production of Bert V. Royal's "Dog Sees God: Confessions of a Teenage Blockhead"

What do you think happens when we die?

“Hecate is the goddess of death...”

“Either you are reborn or you dissolve into nothingness...”

“Maggot food!”

“They go to heaven.”

These are only a few of the answers provided by CB's friends as he mourns the death of his pet beagle. In “Dog Sees God: Confessions of a Teenage Blockhead,” an unauthorized parody of the *Peanuts* comic strip by Charles Schulz, playwright Bert V. Royal continues Charlie Brown's (CB's) story into adolescence where the beloved blockhead – an icon of American youth – encounters modern threats to childhood's innocence. *Loss of Innocence* jumps into Royal's world and explores how teenage students address alcohol, drugs, sexual activity, and prejudice on a daily basis. The project looks into our generations' views of morality, insignificance, and rejection – hoping to bridge gaps based on religion, gender, and social differences. This poster presentation outlines Royal's play, the SIUC staged performance, and the director's vision that inspired the production.

Stacie A. Kula and Dr. Ann R. Fischer

Department of Psychology

Resilience and Conformity to Traditional Masculine Gender Role Norms

Although much research has been conducted to identify protective factors that increase one's ability to foster resiliency, little research has examined how protective factors and resiliency factors vary by gender or within a specific gender. The present study examines how conformity to masculine gender role norms, particularly one's level of self-reliance, is related to men's resiliency to everyday stress. Adult males, age 23 and older, completed self-report measures of their recent stressors, psychological distress levels, and conformity to traditional masculine gender roles. A positive relation between stress and distress is expected. The relations between stress and distress will be moderated by the individuals' endorsement of conformity to masculine gender role norms. An examination of the direction of the moderation will be exploratory in nature. This study will test two competing scenarios, both derived from research and theory: (a) conformity to traditional masculine gender role norms increases one's resiliency (weakens the stress-distress relation) and (b) conformity to traditional masculine gender role norms decreases one's resiliency (increases the stress-distress relation).

B. Aneesa Lehman

Department of Geology

Controls on Regional-Scale Magma Flow in the Karoo Large Igneous Province, South Africa

The main objective is to determine if the 183 Ma Karoo mantle plume of South Africa imparted a specific regional pattern to magma flow in dolerite sills that were formed during the plume event. An investigation of magma flow at such a large scale is unprecedented and can only be attempted by using a very efficient method to proxy magma flow directions. Magnetic fabric methods are chosen to pursue this objective because they are rapid and well suited for this type of rocks.

Twenty seven dolerite sills were sampled in South Africa during a two-week field mission. Samples collected using a portable gas drill were oriented with a sun compass (to avoid potential errors due to lightning strikes). 757 specimens were measured at the SIU Rock Magnetism laboratory. The magnetic foliations are very consistent at the station scale and have subhorizontal attitude, as is expected in horizontal sills. The magnetic lineations record the direction of magma flow during sill emplacement.

These directions are consistent within a single sill but vary from sill to sill. At the regional scale, both a WSW-ENE and a NW-SE flow direction trend coexist. Neither of the predicted "plume-related" flow patterns matches the directional results. The existence of two principal flow directions across the basin and the consistency in direction displayed by neighboring sills suggests controls by deep, basin-scale structures. In addition, flow directions in a horizontal sill are expected to be perpendicular to the strike of the feeder dike. In conclusion, our results support a model in which magma flow directions at the regional scale are determined by NE-SW growth faults and by ESE-WNW major crustal discontinuities in the Proterozoic basement underlying the Karoo Basin.

Elizabeth Lombardi and Dr. Sharon Peterson

Department of Human Nutrition and Dietetics

Relationship between screen time and perceptions of front-of-package nutrient claims of adolescents who are at risk for Type 2 Diabetes

Amount of screen time and risk of Type 2 Diabetes (T2DM) are both rapidly increasing in today's adolescents. Children are exposed to many different low-nutrient foods in various types of media and may believe that the healthier choice is the one seen most often. The purpose of this study was to determine if amount of screen time affects the overall perception of front-of-package nutrient claims among adolescents who are at-risk for T2DM.

A written survey was collected at baseline as a part of the "R.U.A. Healthy Kid?" program. From this, an overall screen time score was calculated. Four scenarios were developed to compare the front panel of similar food products, where one appeared to be "more nutritious" while the other seemed "less nutritious" but was actually the healthier choice. Participants were given a written handout to choose which product they thought had the least or most amount of a specific nutrient. A nutrient claim score was calculated by totaling the amount wrong out of four.

A negative correlation was found between time spent talking on the phone and time playing non-active video games, indicating the more they talked on the phone, the less time was spent playing video games. A positive correlation was found between time spent texting and time watching TV, meaning the more time spent texting, the more time spent watching TV.

A comparison between amount of screen time and amount wrong from the nutrition education game revealed no statistically significant relationships. This is most likely due to the small sample size. These preliminary results should be reassessed in a larger sample size with different types of media and more scenarios. Determining the relationship between screen time and nutrient claims on snack packaging is important in understanding how media affects adolescents' perception on what healthy "looks like."