



Iowa Regent Universities present
the 5th Annual

Research in the Capitol

Thursday, March 25, 2010
11:30am – 1:30pm
Iowa State House, Rotunda
Des Moines, Iowa

Iowa Regents Universities Contacts

Robert Kirby

Director

Iowa Center for Research by Undergraduates
Associate Director
University of Iowa Honors Program
The University of Iowa
443 Blank Honors Center
Iowa City, Iowa 52242-0454
Phone: 319.335.1684
robert-kirby@uiowa.edu

Jessica Moon

Director

University Honors Program
University of Northern Iowa
2401 College St.
Cedar Falls, Iowa 50614-0355
Phone: 319.273.3175
jessica.moon@uni.edu

Dana Schumacher

Assistant Director

Undergraduate Research and Scholarship
University Honors Program
Iowa State University
2130 Jischke Honors Building
Ames, Iowa 50011-1150
Phone 515.294.0172
dschumac@iastate.edu

Special Thanks

Joe Murphy
Karen Osenbaugh
Katherine L. Wildman
Brenda Hackenmiller



Welcome

On behalf of undergraduates at our three Regent Universities, welcome to the fifth annual Research in the Capitol. Research is about learning and that learning comes to fruition when it is shared with others. The opportunity for our students to share their knowledge and exuberance with legislators, Regents, and guests in the Iowa State House is a privilege and a special honor.

Research involvement plays a central role in undergraduate education. Students who take part in research are more successful academically, are more developed in their career and professional preparation, and are more satisfied with their college experience. Research engagement provides conditions for collaborative learning and critical thinking that benefit students as they move into the workforce or on to graduate or professional training. These presentations required countless hours of effort on the part of the students and their mentors outside of the classroom and represent the shared commitment our students, staff, and faculty place on the undergraduate experience.

As you speak with the outstanding students, you will learn first hand the impact research involvement has on Iowa's students and the impact those students have on the research conducted at our outstanding Iowa Public Universities.

Robert Kirby
Director

Schedule

11:15-11:30 University of Northern Iowa String Quartet
Performing movements from Bedrich Smetana
String Quartet No. 2 in e minor, "From My Life"

11:30 Opening Remarks
Bob Kirby
Director, Iowa Center for Research by
Undergraduates

Jack B. Evans
President Pro Tem, Iowa Board of Regents

Jennifer Blaser, Bettendorf, Iowa
Senior, Iowa State University

11:45-1:30 Student Poster Presentations

12:00-12:15 University of Northern Iowa String Quartet



Ruth Kiang, violin,
Urbandale, IA

Holly Schult, violin,
Ackley, IA

Joyce Payer, viola,
Des Moines, IA

Michael Sturgeon,
cello, West Des
Moines, IA



59. Viability of Weather Dis- semination Via Social Network Technologies

Justin Wittrock, Algona, IA
Major: Meteorology
Mentors: Dr. William J. Gutowski,
Dr. Kelvin K. Droegemeier &
Somer A. Erickson
Iowa State University

Social networking is a recent product of the ever-increasing advancement in online technology and society's penchant for new modes of communication. Although social network sites are now used to share a broad array of content and are having global impact on topics as significant as national elections, few studies have been conducted to determine the viability of disseminating weather information via social network technologies. Social networking may serve as a useful mechanism for the rapid communication of weather information, especially for severe weather phenomena. The purpose of this study is to determine views by the general public on the practicality and feasibility of using social network sites as a source for weather information distribution. This purpose is fulfilled by conducting a web-based survey given to a group of people that are within the age range of 18 to 65 years old.



60. Interactions of Soil Type, Microorganism Community, and Nutrient Level

Emily Zimmerman, Marinette, WI
Majors: Biology & Global
Resource Systems
Mentor: Dr. W. Stan Harpole
Iowa State University

Research has long suggested that soil microorganisms can have strong effects on plant species (van der Hiejden et al. 2008; Watkinson 1998). For example soil pathogens can strongly reduce plant growth, while other microbes can facilitate plant growth. However, as the demand for higher yielding plant communities continues to grow, it will be advantageous to understand not only the effects of microbial communities on the growth of plants, but also in the context of other environmental factors. Thus, the aim of this study was to compare plants grown within in home soil versus away soil; with intact microorganisms versus microorganisms that were disturbed through sterilization; and at different nutrient levels, which also aided in controlling for possible effects of soil sterilization on nutrients. Therefore, I have hypothesized that the effect of soil microbes will depend on the origin of the soil, the disturbance treatment, as well as the nutrient treatment.

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57. Zooarchaeological Analysis of Animal Remains from the Scott County Pueblo, Kansas

Sandra Walker, West Liberty, IA
Major: Anthropology, Biology
Mentor: Dr. Matthew E. Hill
The University of Iowa

Scott County Pueblo is a 700 year old Native American archeological site in western Kansas. The site is unique, being the easternmost site of its kind known in North America. This project examines hunting and butchery strategies used by the site's inhabitants to acquire and consume animals such as white-tailed and mule deer, antelope and elk. Detailed analysis was performed on over 600 bones and fragments. This analysis included making identifications as to the species represented, and the age and number of animals present. This project characterized the damage to the assemblage caused by natural weathering, breakage patterns, and the presence and type of humanly produced butchery marks. Classification and statistical analysis of these details about the animal's remains provides a greater knowledge base from which we may understand the subsistence strategies and life ways of the Puebloan peoples which inhabited the site. In addition, these results may inform on how important hunting was to the diet of the site's occupants, who mostly made their living through farming corn.



58. Describing Matilda: Language, Gender Roles, and the Medieval Church

Elizabeth Wiedenheft, Mason City, IA
Major: History
Mentor: Dr. Jay Lees
University of Northern Iowa

The Empress Matilda was known by many different titles, most of which encompassed only the expectations of marriage and motherhood. One of her titles, however, makes no reference to these roles: Matilda, Lady of the English. In becoming Lady of the English, Matilda defied traditional expectations, entering into a civil war and seizing the government of England in April 1141, ruling the country for 10 months on her own merit. In this project, I examine Matilda's efforts to gain the throne of England, focusing on the language her contemporaries used to describe her. In many sources, Matilda is compared to female Christian archetypes, especially Eve and the Virgin Mary, highlighting the influence of the Church in establishing and maintaining gender roles. By examining Matilda and medieval gender roles, this project demonstrates the importance of the Catholic Church in medieval Europe and the impact it had on Matilda and future medieval women rulers.

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55. Associations of Canine Distemper Through Vaccination or Specific Genetic Line

Chris Thomson, Centerville, SD
Major: Animal Science & International Agriculture
Mentor: Dr. Matthew Ellinwood
Iowa State University

Canine Distemper (CDV) is a sometimes incurable viral disease causing respiratory, gastrointestinal, and central nervous system problems. This project aimed to assess the correlation of CDV with incidences of cerebellar/seizure/post ictal signs in individuals in our canine colony. We conducted an epidemiological study, comparing two possible modes of infection: vaccine product or genetic contribution. The vaccine may be the cause of these adverse side-effects through direct infection at vaccination or by causing problems after the primary immune response. We find there is a potentially stronger correlation to the dam suggesting maternal transfer, rather than through the vaccination, however, our data remains largely inconclusive. Additionally, our findings lay the foundation for future research concerning CDV within the closed environment of our colony, should there be a recurrence.



56. Mapping the lesioned brain

Annie Tye, Iowa City, IA
Major: Biology
Mentor: Dr. Daniel Tranel
The University of Iowa

The human brain can be thought of as the orchestrator of the symphony that is your life. When it works well, the output is an incredibly beautiful and complex range of behaviors. But when there are regions of damage, it's as if one or more instruments are out of tune. If we can determine the dissonant instruments, perhaps we can restore harmony. The Boston Symphony and the Los Angeles Philharmonic can have very different personalities even while playing the same piece. The critic's challenge is to compare the [anatomy] of a single piece even when it is performed quite differently. Likewise, a challenge for neuroanatomists is to accurately compare two brains while accounting for anatomical differences. I use magnetic resonance image (MRIs) to graphically recreate lesions while maintaining the anatomical fidelity by reorienting a [template] MRI of a healthy brain to match the coordinates of the damaged brain. After mapping the lesion, the template is re-rendered to its normal coordinates. Several maps can then be overlaid to show patterns of brain damage. If a group of patients display a common behavioral deficit and also shares a common region of damage, we can infer a relationship between anatomy and behavior.



53. Purchasing Subscription Reference Databases in the Iowa Elementary Public School Library

Michaela Seeman, Beaman, IA
Major: Elementary Education
Mentor: Dr. Karla Krueger
University of Northern Iowa

The purpose of my research project is to explore how subscription reference databases affect purchasing decisions in Iowa elementary public school libraries in buildings with four hundred students or less. Through my research, I will inform teacher librarians of how others in their field are making purchasing decisions about subscription reference databases and print resources and the thought process behind these choices in order for them to make an informed decision regarding their own collections. Through my conducting of a survey of current Iowa public school teacher librarians in schools of this size, I compared the use of print and subscription reference databases available to students and faculty. The knowledge of purchasing decisions and reasoning behind these choices are incredibly important, and I hope this research and information will allow these schools to allocate their limited budgets in a way that best supports the education of every student.



54. Profits for a Purpose: Examining the Integration of Economic and Social Orientations
Charlie Strutzenberg, Urbandale, IA
Major: Management
Mentor: Dr. Adele Santana
University of Northern Iowa

Historically, a dichotomy has been endorsed amongst market participants that has effectively distanced firms that have an economic agenda from firms that have a socially oriented directive. Recently, this dichotomy has been dismissed as a logically erroneous polarization of the capabilities of capitalism. This out-dated paradigm that once acknowledged an “either-or” relationship between profits and people is now being replaced by seeking creativity in establishing a “both-and” solution to create a company that integrates both economic and social objectives. This research investigates the process companies endure to transform their predominantly economic orientation to include social considerations. Three to five companies are selected from small private organizations located in Iowa that have been recognized for their social orientation. In depth interviews with key decision makers regarding social policy are conducted in order to identify similarities and differences in their cultivation of a social charter. A process model of the integration of social orientation is an expected outcome of this research.

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1. Woodland Sites in the Cedar Valley

Cristy Abbott, Waterloo, IA
Majors: Anthropology & Environmental Geography
Mentor: Dr. Donald Gaff
University of Northern Iowa

The University of Northern Iowa has conducted field school at Hartman Reserve, Cedar Falls, Iowa (site 13BH164), in 2008 and 2009. This effort yielded both historic and prehistoric materials and the initial analysis of the prehistoric artifacts, including ceramics and lithics, as well as Geographic Information Systems (GIS) computer modeling has revealed that this site was established for the specific purpose of resource extraction. The analysis is performed by plotting resource zones and the geomorphology within GIS, which provides maps illustrating the catchment areas relative to the selected sites. Utilizing GIS, I am able to view any potential relationships between other site locations, the resources available and the terrain. Inferences are made about the foragers' utilization of and reliance upon naturally occurring resources and site locations. Analysis performed will broaden our understanding of the Woodland era's natural human habitats in northeastern Iowa.



2. Playing Like a Girl: An Analysis of the Role of Gender in Trumpet Performance

Leslie Aboud, Algona, IA
Major: Music
Mentor: Dr. Randy Grabowski
University of Northern Iowa

The goal of my research is to use experiences and opinions of prominent female trumpet players to identify the role gender plays in Classical trumpet performance from the standpoint of musical expression and approaches to performance. In order to carry out these goals, interviews will be conducted via written questionnaires with prominent female Classical trumpet players in order to gauge what they believe to be the impact of gender on their profession. The study will explore the experiences of these professional women and their perceptions of the role of gender while explaining the variances and emphasizing the similarities in their responses. The end result of this study, taking the form of a journalistic view of the experiences and views of these women, will serve as a guide for future generations of Classical female trumpet players who wish to use their gender to its greatest potential in trumpet performance.



51. Multi-level Translation of Research Application in Nursing Homes (M-TRAIN): A case study example of pain and urinary incontinence interventions for residents with dementia in nursing homes

Jennifer Schwarzkopf, Breda, IA
Jamie Puppilo, Oswego, IL
Major: Nursing
Mentor: Dr. Janet Specht & Ann Bossen
The University of Iowa

Purpose and Rationale: Forty-five to 83% percent of elders in long-term care facilities experience pain, and 50% experience urinary incontinence (UI). When looking at residents with cognitive impairment (CI), 60% of residents had at least one diagnosis known to cause pain, however, they hadn't been prescribed any pain medication in the past month; 80% of CI residents experience UI. These alarmingly high numbers warrant the need for implementation of evidence-based practices (EBP) within nursing homes. The M-TRAIN study has proposed specific pain and UI EBPs to implement in nursing homes. The purpose of using case studies to facilitate incorporation of EBP is to demonstrate strategies to help nursing home staff implement EBPs in regard to pain and UI for persons with dementia. Sharing evidence alone does not change practice; the ultimate test to determine if EBPs were implemented effectively is to change resident outcomes.



52. Reducing excess imaging dose to cancer patients receiving radiotherapy

Adam Schwertner, Cedar Falls, IA
Major: Biomedical Engineering
Mentor: Dr. Ryan Flynn
The University of Iowa

We examined a method that prevents over dosage of sensitive normal tissue by the imaging system that is used to position cancer patients receiving radiotherapy. The patient positioning system called mega voltage cone beam computed tomography (MVCBCT) is used prior to patient's radiation delivery to prevent the therapeutic beams from missing the tumor and causing collateral damage to healthy tissue. This result is achieved by including the imaging dose as a portion of the treatment plan thereby reducing the dose increase due to imaging by 40% to the parotid glands for head and neck cancer patients.



49. Involvement in International Adjudication and the Use of Torture

Blake Rupe, Ottumwa, IA
Major: International Studies
Mentor: Dr. Thania Sanchez
The University of Iowa

This project investigates the current use and severity of torture by countries who are active and participating members of the International Court of Justice and the European Court of Justice. I compare torture used by members of these courts before and after they became members to discover the importance of international mechanisms in deterring the use of torture. This research is relevant at the domestic level because if adjudication does not work, it will take domestic awareness and action to deter torture and advance human rights in the 21st century.



3. Study in Development: Micro-credit to Marketing

Samuel Bird, Gilbert, IA
Majors: Global Resource Systems & Economics
Mentor: Dr. Robert Mazur
Iowa State University

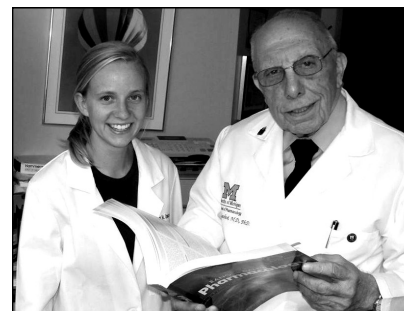
Smallholder farmers in developing countries struggle to earn a living wage from selling produce. This research project investigates methods used to spur income generation in rural communities populated by these farmers. One initial obstacle faced by farmers is the ability to transition from subsistence agriculture into income-generating, commercial agriculture. Beginning with micro-credit as an approach to capital accumulation, the poster follows the transformation of capital into marketable produce. Value-chain dynamics are assessed with respect to opportunities available to farmers and how forming cooperatives can affect their market potential. Roles of producer organizations and farmer cooperatives are emphasized not only as economic institutions but also as social ones. The poster presents development as both an economic and social goal, and examines various development approaches in both contexts.



50. Reconstructing Roman Fountains

Hannah Scates, Des Moines, IA
Major: Anthropology
Mentor: Dr. Brenda Longfellow
The University of Iowa

Ancient Roman fountains reflect much about the lives of the Roman civilization. Fountains were a social gathering spot and were therefore great venues for political propaganda and the expression of social status. Unfortunately, these ancient fountains are greatly decayed and many have a difficult time visualizing them. By reconstructing these ancient Roman fountains into 3d computer models, one can more easily visualize the fountains in their more complete form. In turn, one can more readily determine the political and social motivations for erecting splendid water features central to the Roman way of life.



4. Cocaine Esterase: A Promising Therapeutic Agent for the Treatment of Acute Cocaine Exposure

Jennifer Blaser, Bettendorf, IA
Major: Microbiology
Mentor: Dr. Benedict Lucchesi
Iowa State University

Currently, there is no direct anti-cocaine therapeutic to treat individuals arriving in emergency departments suffering from cocaine overdose. The present study investigates the ability of bacterial cocaine esterase (CocE) to alter and/or prevent the adverse cardiovascular effects of cocaine. In the ex vivo model (rabbit Langendorff perfused heart), hearts were equilibrated with Krebs-Henseleit buffer, followed by exposure to 100uM cocaine HCl for 15 min, after which 0.4 mg/ml CocE was infused at rate of 0.5 ml/min in the continued presence of cocaine for a period of 90 min. Heart rate, coronary perfusion pressure, and left ventricular pressures were recorded. In comparison to cocaine treated and time control hearts, CocE effectively reversed the cardiotoxic effects of an acute toxic cocaine concentration. The data demonstrate that CocE can rapidly hydrolyze cocaine thereby terminating the deleterious actions of the alkaloid. CocE is being developed as potential treatment for the reversal of cocaine overdose.



5. Exploring intercalation of TMDCs by 3-d metals

Kayla Boyle, Ankeny, IA
Major: Chemistry
Mentor: Dr. Laura Strauss
University of Northern Iowa

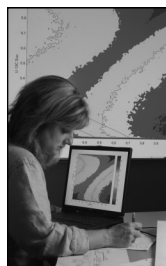
A range of 3-d metal intercalates were added to several layered transition metal dichalcogenides, TMDCs, to explore the effects of this intercalation. Introducing a 3d-metal intercalate between the layers of the TMDC slightly alters the spacing in the crystalline lattice through the expansion or compression of the c-axis. The synthesis of these materials utilized chemical vapor transport, with iodine as the carrier agent, in a single-step preparation from the elements. A specific focus was placed on the extent of the lattice shift and the success of the intercalation at each concentration. The c-axis shift in each sample was found using powder x-ray diffraction analysis, while the intercalation success was determined from quantitative analysis using energy dispersive x-ray spectroscopy. The variation in TMDC compounds provided insight into whether the observed trends are consistent throughout all TMDCs or are specific for a given compound.



47. Identities on m-ary Partition Sequences

Mackenzie Roepke, Urbandale, IA
Major: Mathematics
Mentor: Dr. Theron Hitchman
University of Northern Iowa

The purpose of this research is to study properties of m-ary partitions. An m-ary partition is a way to write a number n as powers of m. For example, $7 = 2^2 + 2^1 + 2^0$ is a 2-ary partition of 7. We study the function $bm(n)$ that counts the number of these partitions for any m and n. We begin to find interesting patterns in these sequences when m is fixed and n continues to grow. We observe surprising symmetry in polynomials formed by these sequences. We attempt to explain and predict these symmetries.



6. Alkaloid Extraction and Purification from Catharanthus roseus Hairy Root Tissue

Diane Brown, Des Moines, IA
Major: Chemical Engineering
Mentors: Dr. Jacqueline V. Shanks & Dr. Guy Sander
Iowa State University

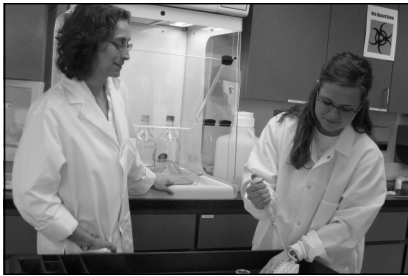
Plant metabolic engineering of *Catharanthus roseus* may provide improved ways of producing vincristine (Oncovin®) and vinblastine (Velbe®) which are currently used in the treatment of cancer. These compounds are produced in very small quantities in the plant leaves (less than 1g per 1000kg of dry biomass) and are very expensive (\$1000-4000/g bulk pricing). Genetically modified *C. roseus* hairy roots are used to analyze the metabolic flux "upstream" of the desired product with the goal of increasing "downstream" production. Alkaloid compounds were extracted and purified from hairy root biomass and then analyzed using liquid chromatography-mass spectrometry. Two of the unknowns collected have been identified as 16-hydroxytabersonine and 6,7-dehydroechitovenine marking the first time the compounds have been isolated and identified in hairy root tissue.



48. Evaluation of University of Iowa-Owned Land for Wind Turbine Placement

Scott Ruebush, Coralville, IA
Major: Mechanical Engineering
Mentor: Dr. Barry Butler
The University of Iowa

The University of Iowa is interested in sustainable energy to power its campus and is exploring installing a wind turbine to meet these goals. Conveniently, the University owns a plot of land near Hills, Iowa, on which the turbine could be built. Anemometer data have been collected over a period spanning from May 2007 to February 2009. The wind data have been analyzed using Microsoft Excel. Power curves of the Clipper Liberty wind turbines were used to estimate the expected energy output. Finally, long-term economic analyses were calculated using projected energy output, turbine costs, and costs of electricity.



45. Playground Surfaces and Children's Health: The Iowa 2008 Flood Experience

Kelsie Reeve, Tipton, IA
Major: Health Promotion
Mentor: Dr. Catherine Zeman
University of Northern Iowa

Serious flooding events raise concerns about increased distribution of toxic substances in flooded areas. This is true for the Iowa flood of 2008. In response to these events a small, cross-sectional pilot study was done to examine the levels of polyaromatic hydrocarbons, PAHs, at select school playgrounds in Black Hawk County. Playgrounds were selected based on their status relative to the flood of 2008 and the type of playground surface. Sampling and assessment protocol included exposure assessment modeling of soil ingestion, air intake, and dermal absorption. This data will be presented along with its status relative to flooding and playground surface composition.



46. Identifying Genes and Single Nucleotide Polymorphisms Associated with Salmonella Infection Traits to Improve Pig Genetic Resistance and Pork Food Safety

Yasaira Rodriguez, Gurabo, Puerto Rico
Major: Microbiology
Mentor: Dr. Christopher Tuggle, Iowa State University

Salmonella infection in pigs is an animal health issue and food safety concern. By identifying genes and genetics variations such as single nucleotide polymorphisms (SNPs) associated with resistance to Salmonella we want to improve swine genetics. We used three different populations to screen and analyze association of SNPs with Salmonella shedding / internal bacterial burden phenotypes. We used restriction fragment length polymorphism and Tetra-Primers ARMS PCR to genotype three SNPs. Only one of them, CCT7 SNP #3 was statistically associated with Salmonella shedding phenotype in the Field and Salmonella liver counts in IAH-Compton populations. The other two, DAP12 & CD163 #2 were not statistically associated with Salmonella shedding phenotypes in the Field and IAH-Compton populations. None of the SNPs were statistically associated with salmonella shedding in the NADC population. Genotypic and statistical data can be used to improve swine genetics by selecting for more resistant and low shedding Salmonella phenotypes.



7. A Mixture of Identities: A Look at Zulu Nationalism in the Nazareth Baptist Church

Brian Buh, Marion, IA
Majors: International Studies, Political Science & Religious Studies
Mentor: Dr. Ralph Keen
The University of Iowa

The Nazareth Baptist Church in South Africa is a unique mixture of traditional Zulu religion and Christianity that has been combined to create a new religious movement. The church, which has a following of around 5 million people, has often been labeled as a Zulu pride movement. My research project examines this claim in the post-Apartheid era to see whether Zulu pride still runs strong in the church and to what extent it does. I also look at the question of identity, and whether followers primarily identify themselves by their racial, ethnic, or religious qualities. South Africa provides researchers with an opportunity to study identity change. A better understanding of the power of identity change and group dynamics allows us to better understand how to cure other problems within society. For example, a understanding of the group identity will allow future aid-workers to find the best possible ways of fighting the HIV/AIDS epidemic that is plaguing South Africa. It can also help combat the high poverty rates. As lowans, these problems are human rights issues that we can take an active part in to ensure the freedom of others.



8. Antioxidants, Heart Disease, and Nox4 in Between

Samuel Carrell, Shenandoah, IA
Major: Integrative Physiology
Mentor: Dr. Francis Miller
The University of Iowa

The formation of coronary artery disease (CAD) involves several cell types and processes. Smooth muscle cells play a distinct role in CAD formation, and an understanding of their physiology is necessary to successfully prevent the disease. Although antioxidants have proven unsuccessful in treating heart disease, oxidants produced by NADPH Oxidases (Noxs) remain important regulators of smooth muscle cell physiology. Here we show that Nox4 regulates the concentration of key antioxidants of the cell, and maintains cell survival against oxidative insults. These findings implicate Nox4 as sending out a survival signal maintaining cell viability, ultimately leading to disease.



9. Assessing Pollination of Muskmelon (*Cucumis melo*) in Iowa

Ximena Cibils-Stewart, Montevideo, Uruguay
Majors: Biology & Entomology
Mentor: Dr. Mark Gleason
Iowa State University

Due to shortage of commercial honeybees (*Apis mellifera*) in the U.S, wild pollinators are critically important to producers of many high-value crops. Muskmelon crops depend on insect pollination for proper fruit formation, but little is known about the contribution of wild pollinators. To assess diversity and relative abundance of wild pollinators in muskmelon, we observed pollinators in muskmelon flowers near Gilbert and Muscatine, Iowa, during the summer of 2009. At both locations, insects in the order Hymenoptera were most numerous, followed by Diptera and Coleoptera. The number of pollinators was highest during the peak bloom period for the crop. Pollinator activity was substantially higher in the afternoon (between 1-3 pm) than in the morning (7-10 am). This timing differs from published observations of wild pollinators on summer squash in which pollinator activity peaked in the morning. Our study provides the first published information about wild pollinators of muskmelon in Iowa.



10. The truth behind the mommy wars: A quantitative study on mothers' life satisfaction and identity

Elizabeth Cooney, Des Moines, IA
Major: Communications
Mentors: Dr. April Chatham-Carpenter & Dr. Victoria DeFrancisco
University of Northern Iowa

Over 40 years ago, leading feminist author and activist Betty Friedan criticized America's image of women in her book, *The Feminine Mystique*. Her main argument and hope was for women to be aware of their options, as well as the role society attempts to put them in, and not be afraid to challenge it. This study looks at how mothers today view their role in society, choose their lifestyle, and measure their self-satisfaction. Approximately 189 women completed an online survey, consisting of both stay-at-home mothers and mothers working outside of the home. Results found no significant difference between moms on life satisfaction; however there was evidence of difference in identity, with working mothers scoring higher on identity issues than stay-at-home mothers. This study will allow a broader understanding of how mothers create their sense of identity and rate their quality of life within the spheres of work and family.



43. Investigation of Cadherin Expression During Secondary Neurulation in the Chick Tail Bud

Katherine Olson, Odebolt, IA
Major: Biology
Mentor: Dr. Darrell Wiens
University of Northern Iowa

Cadherins are a group of cell adhesion molecules that help mediate cell interactions involved in cell migration and organ formation during embryonic development. Following formation of the primary neural tube during development, secondary neurulation occurs at three days by cavitation in the mesenchyme of the tail bud, a process that is expected to require dynamic changes in cell adhesion. We investigated the expression patterns of five cadherins (N-cadherin, E-cadherin, cadherin 6B, 7, and 11) in the tail bud during Hamburger and Hamilton stages 15, 17, and 19-21 using immunolocalization. Our findings show that the expression of cadherins becomes more abundant in the secondary neural tube as development progresses suggesting an involvement in cell organization of the spinal cord. We are investigating the intervening stages to further define the dynamic pattern of cadherin expression during the process of secondary neurulation.



44. Examining the Effects of VAP on Vinculin

Melissa Palma, Waterloo, IA
Major: Biochemistry
Mentor: Dr. Kris DeMali
The University of Iowa

In the state of Iowa, cancer is the second leading cause of death. The State Health Registry of Iowa estimated that 6,300 Iowans died from cancer in 2009 alone, 14 times the number caused by auto fatalities. On the molecular level, the cell conducts countless highly organized processes to grow, with defects or mutations sufficient to advance cancer formation. For example, a decrease in cell adhesion, the cells' ability to stick to one another, causes tumors to metastasize and travel to other parts of the body where they can generate new cancerous growths. The subject of this study is vinculin, which is an important regulator of cell adhesion and therefore a prime candidate for cancer studies. We have identified a short vinculin activating peptide (VAP) comprised of three vinculin binding sites (VBS) that increase integrin-mediated adhesion to extracellular matrix elements that are crucial for cell adhesion. By studying the effects of VAP on vinculin, we hope to determine ways to increase adhesion selectively for use in future cancer treatments.



41. The Deduction Reduction Debate (Obama's Nonprofit Reforms)

Paige Nagle, Long Grove, IA
Major: Leisure, Youth, and Human Services
Mentor: Ms. Angie Gorsuch
University of Northern Iowa

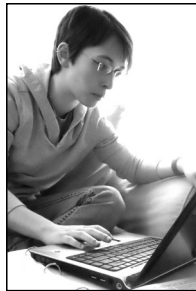
This research examines the various arguments presented by key stakeholders in the debate about proposed reductions in charitable deductions, an idea first proposed in 2009 by President Obama and the Senate Finance Committee as a means to finance health care reform, and just recently revived for the 2011 federal budget. In both instances, the proposal generated strong reactions by nonprofit sector professionals, donors, and policymakers; some are in favor and some are opposed to such changes in charitable deductions levels. An immediate concern is the potential impact on charitable contributions. Some research suggests giving will not be negatively impacted but in fact, could potentially increase in the immediate future. Others disagree, arguing that charitable contributions will significantly decrease if charitable deductions levels are lowered. This research presents issues of inequality in our federal tax code, distinctions between charitable and philanthropic giving, and alternative models for encouraging and facilitating charitable giving.



11. Maternal Omega-3 Fatty Acid Intake on Fetal Status

Lindsey Currie, Schaller, IA
Major: Dietetics
Mentor: Dr. Christina Campbell
Iowa State University

The omega-3 fatty acid, docosahexanoic acid (DHA), found primarily in fatty fish benefits fetal development. Prenatal recommendations are 200mg DHA per day, however DHA intake of non-coastal women is poorly documented. To determine DHA intake, 69 healthy pregnant women (week 28 of gestation) from Iowa completed an interview based 107-item food frequency questionnaire reflective of foods consumed during the previous month. Of the 69 women, only 12 (17%) consumed the recommended 200 mg DHA per day. Mean and median daily intake (n=69) was 128 ± 22 mg and 47 mg, respectively whereas women taking a supplement (n=15) had a mean and median intake of 305 ± 346 mg and 200 mg DHA per day, respectively. In non-supplement users, average intake was 56 ± 70 mg DHA per day.



42. Marat/Sade: Découvert

Laura Neill, Cedar Falls, IA
Majors: French Studies & Theatre
Mentor: Dr. Jay Edelnant
University of Northern Iowa

Marat/Sade, the 1965 revolutionary play by German playwright Peter Weiss, offered complex and exciting challenges to UNI theatre students due to the historical nature of the piece. The layered production takes place in 1808, during Napoleon's reign, in the famous castle for the insane, the Charenton Asylum in Paris. The Marquis de Sade produces a play with asylum inmates set during the Reign of Terror, 15 years earlier. In addition, there is also an echo of the cultural revolution of the 1960s. The French Revolution is only glanced over in most high school and early college history courses, so a major challenge of an American production is the limited average knowledge base among a large cast. Due to the vast amount of research required to help actors connect to the historical context, this project resulted in a compilation of research regarding the French Revolution to provide the cast with a guide to historical information critical to the production.



12. How social interactions with similar and dissimilar others affects circulating testosterone levels

Rory Deol, Cedar Falls, IA
Majors: Biology & Psychology
Derrick McAdams, Red Oak, IA
Major: Psychology
Mentor: Dr. Catherine DeSoto
University of Northern Iowa

The current study investigated young men's testosterone level changes as a result of interacting with other males. Male participants were led to believe that a group they would be interacting with was either similar to them or not similar. The interaction was then one of two types: the others were inclusive, or the others excluded the participant. Participants provided saliva samples before and after the interaction. Results suggest that interacting with highly similar males increases circulating testosterone, whereas interacting with a dissimilar and novel out-group actually lowers testosterone. The nature of the interaction was less important than similarity. Considering that testosterone surges may relate to attempts to gain status within one's group, the results are interpreted as consistent with viewing hormonal changes as a mechanism to alter current behavioral propensities in ways that are likely to be most adaptive.



13. BPlansForHumanity

Alan Fritzier, Clive, IA
Majors: Management Information Systems & Economics
Anne Talbot, Urbandale, IA
Major: Management Information Systems
Mentor: Dr. David Burgess
The University of Iowa

Social entrepreneurs recognize social problems and use entrepreneurial principles to organize, create, and manage ventures for social change. Whereas a business entrepreneur measures performance in profit, a social entrepreneur assesses success in terms of impact on society. While social entrepreneurs traditionally worked through non-profit organizations, many now work in the private, government, and academic sectors. This shift has helped entrepreneurs raise capital, yet they increasingly require other types of support like new ideas, tools, and volunteers with specialized skill sets. BPlansForHumanity satisfies these needs by matching up projects with volunteers, providing project management tools for virtual collaboration, and facilitating the sharing of new knowledge. Last semester, an Iowa student designed a beta-version of the web portal that was first used during Iowa's Winterim in India program to track student service work. The development team is now designing higher functionality and planning for growth - BPlansForHumanity aims to become the preeminent non-profit web portal in Iowa for people and organizations to develop, implement, and sustain social entrepreneurship ventures.



14. Comparative Advantage in the Bullpen

Lisa Gillette, Ottawa, IL
Majors: Economics & Finance
Mentor: Dr. John Solow
The University of Iowa

Understanding the relationship between players performance and their pay is perhaps the longest running issue in sports economics. While a considerable amount of this research in baseball has involved hitters, relatively little has been done on pitchers. As Krautmann, Gustafson and Hadley [2003] have pointed out, there are two reasons for this: measuring pitchers' performance independently of their teammates is difficult, and different pitchers perform different roles on the team, giving rise to pay structures that reward different aspects of performance depending on whether the pitcher is a starter or a reliever. Of course, the role that a pitcher plays on a team is an endogenous decision. Strengths in various dimensions, both physical and psychological, are likely to make a given pitcher more effective as a starter or as a reliever. In this paper, we make a first attempt at examining the factors that determine the role that a major league pitcher plays on a team.



39. Under Wraps: Symbolism in West African Textiles

Anna Mullen, Davenport, IA
Majors: Anthropology & History
Mentor: Dr. Sara Marcketti
Iowa State University

The wide array of cloth produced in Western Africa shows the diversity of its individual cultural groups. This research compares symbolism in the four major textiles of the sub-Saharan region. Symbols in textiles from the Iowa State University Textile and Clothing collection are compared to kente, adinkra, and traditional Bogolanfini "mud cloths." Each use color, cut, and icons to translate ideas through nonverbal communication. In the late twentieth century, corporate-funded wax-print patterns began infusing global images into the cultural textiles. Just like a single thread in the loom, the details of West African textiles are the key to understanding the culture itself. While the globalized market may boost production and spread the design concepts to multi-national businesses, it never takes away from the traditional iconic symbols of the original culture.



40. Teenage Mothers Psychological Well-being as a Result of a Male Partner

Shalome Musignac-Jordan, San Juan, Puerto Rico
Majors: Child, Adult, and Family Services & Sociology
Mentor: Dr. Kere Hughes-Belding
Iowa State University

The purpose of the study is to examine the relationships between the presence of male partners and the psychological well-being of teenage mothers. Specifically, to investigate the prevalence of partner support and examine the relationships between partner presence, mothers' perceptions of how supportive partner is, and maternal well-being variables. The project focuses on two questions: 1. Do adolescent mothers who have a live-in partner (married or living together) differ in depression, self-efficacy, child abuse potential, parenting style, knowledge of infant development, perceptions of support from father, and overall levels of social support? 2. Regardless of living situation, do mothers who perceive higher support from baby's father differ in depression, self-efficacy, child abuse potential, parenting style, knowledge of infant development? The implications of the study are to inform support programs for teenage mothers about the possible benefits of partner support.



37. Effects of age and acclimation temperature on selected temperature, movement, and growth by diamond-backed terrapins

Victoria Moran, Clear Lake, IA Majors: Biology & Biochemistry
Emily Riesberg, Bondurant, IA Major: Biology
Mentor: Dr. Jeff Tamplin, University of Northern Iowa

Effective thermoregulation and the ability to select preferred temperature is an important factor influencing fitness in juvenile turtles. We tested the effect of acclimation/maintenance temperature on selected temperature, movement patterns, and growth rate in 14 – 19 juvenile diamond-backed terrapins from hatching to 10 months of age. Juvenile *Malaclemys terrapin* acclimated to either 22°C or 27°C were tested in an aquatic thermal gradient of 14 – 34°C at 4 – 5 and 8 – 9 months of age. Age affected temperature selection; 4 – 5 month old turtles did not select specific temperatures while 8 – 9 month old turtles selected the two warmest temperatures available (30°C, 34°C). Acclimation temperature did not affect selected temperature; 22°C- and 27°C-acclimated turtles both chose the two warmest temperatures available (30°C, 34°C), although 22°C-acclimated turtles were more efficient at choosing the warmest temperature in the gradient. Acclimation/maintenance temperature did not affect growth; 22°C- and 27°C-acclimated turtles grew at similar rates and were of similar body size at 10 months of age.

38. Community services for children with feeding and communication disorders in Nicaragua



Liz Muetting, Spencer, IA
Kristin Anderson, Emmetsburg, IA
Majors: Communicative Disorders
Mentor: Dr. Ken Bleile
University of Northern Iowa

This research is part of a multiyear project focusing on providing clinical services to children with feeding and communication disorders in three orphanages and schools in and around Managua, Nicaragua. During previous years, the project focused on test piloting (1) a picture pointing system for communication, and (2) a training modular for families and staff about appropriate feeding techniques for children with disabilities. Our research project focused on refining the instruments developed in previous years, and in test piloting a tracking system to follow and document progress in children from year to year. In this presentation we will describe (1) the training modular for picture pointing system for communication, (2) the training modular for families and staff working with children with feeding disorders, and (3) the documentation process used to track children. Additionally, we will describe modifications being made in the tracking system for the next year of the project.



15. The Hidden Power of the Caucus: The Impact of Early Caucuses/Primaries on Youth Turnout

Mary Jo Halder, Carroll, IA
Major: Political Science
Mentor: Dr. Chris Larimer
University of Northern Iowa

Political scientists have devoted much attention to poor youth voter turnout. However, there is little research on why young adults do turnout, especially in states where turnout is much higher than the national average. Iowa is in a unique position because youth voter turnout during presidential years is consistently in the top 3 nationally; yet, it falters considerably in off-year elections. Potential reasons could be appeal of certain candidates, feelings of civic engagement, and/or salience of issues. One factor that has not been thoroughly studied is the role of the caucus/primary in states early on the election calendar, including Iowa. This research examines youth turnout in presidential elections, using data from early caucus/primary states and a survey sent to students at the University of Northern Iowa. It is hypothesized that youth voters in early caucus/primary states receive more face-to-face interaction with candidates and are, therefore, more likely to vote in presidential elections.



16. In The Ali Way

Ali Horsted, Harrisburg, SD
Major: Communication
Mentor: Dr. Karen Mitchell
University of Northern Iowa

This original solo performance piece is informed by a multidisciplinary approach to performance work from the fields of communication, theatre, gender studies, art and apparel design. Of particular interest is how performance functions as a response to contemporary political, social, and personal issues encountered in the contemporary undergraduate experience, exploring how the self is continually shaped through the constant processing and digestion of seemingly unrelated thoughts and experiences. Original costumes designed and constructed by the author are worn by characters to further identify them, raising questions about how identities are expressed through the visual adornment of the body in various contexts. Combining personal narrative and performance writing with scholarly research and critical theory, this piece challenges the author to express aspects of the self through the embodiment of others, while challenging the audience to respond both emotionally and critically.



17. Mapping and Comparing the Historic Floods of 1961 and 2008 in the Waterloo-Cedar Falls Area

Kevin Jacque, Dyersville, IA
Major: Geography
Mentor: Dr. Andrey Petrov
University of Northern Iowa

The purpose of this project was to compare and contrast the historic floods of 1961 and 2008 in Waterloo, Iowa to see if appropriate zoning and planning precautionary measures had been taken since the flood of 1961. Investigating the historic floods might help in flood protection and zoning decision-making and in reducing flood-related losses. The 1961 maps were developed by digitizing the US Army Corps of Engineers aerial photographs. Digital maps for the flood of 2008 were provided by the GeoTREE Center. Using these datasets we ran tests to compare the two flooding events. Our main objective was to identify urban areas, where post-1961 flood protection and loss minimization measures succeeded and where they failed. Our results indicate that the historic flood of 1961 has not been carefully considered in urban planning. Some infrastructural developments, including housing and roads, have been developed in the areas that were flooded in 1961.



18. Confirming NF- κ B Target Motifs in Genes Responding Early to Salmonella Infection in Swine and Mouse

Beth Kenkel, Council Bluffs, IA
Major: Genetics
Mentor: Dr. Christopher K. Tuggle
Iowa State University

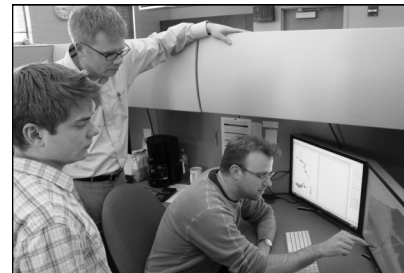
The transcription factor NF- κ B regulates immune responses to Salmonella in humans as well as vertebrates, including the pig. The purpose of this study is to identify novel NF- κ B target genes responding to infection in the pig and to compare these to targets in the mouse. Genes that respond to Salmonella infection were identified from previous RNA expression data (Wang et al. 2007). Novel NF- κ B targets were then predicted through identifying responsive genes whose promoters had possible NF- κ B binding sites. We examined putative NF- κ B binding sites at seven known and five predicted NF- κ B target genes. Sites were tested via binding assays as an initial step to understanding the immune response in pigs. Results confirmed four novel and five known mouse motifs as NF- κ B targets, in addition to three motifs in pigs. We propose that this integrated bioinformatic and experimental approach can be useful in identifying novel NF- κ B target genes during inflammatory processes.



35. Reverse Commuting: It's Effect on the Deterioration Rate of the Chicago Metropolitan Area Highway System

Joel Mendez, Aurora, IL
Major: Community and Regional Planning
Mentor: Dr. Carlton Basmajian
Iowa State University

The decentralization of employment from central cities has been increasing over time. This is the case for the City of Chicago which has several areas of high employment located throughout its suburbs. I believe that reverse commuting has been increasing over the past years thanks to this decentralization of employment. I will analyze if there is a strong relationship between reverse commuting and the deterioration rate of the Chicago metropolitan area highway system. I will identify three highway arterials for my research that connect the city of Chicago to some of its major suburbs and show signs of reverse commuting. I will then research construction projects that have been implemented in the past that focus on maintenance and congestion mitigation for these same arterials. Analyzing the patterns and statistical correlation between these two variables would then determine the strength of relationship between reverse commuting the deterioration rate of the Chicago metropolitan area highway system.



36. Development of a High Resolution Flood Inundation Model of Charles City, Iowa

Matthew Moore, Ottumwa, IA
Major: Civil Engineering
Mentor: Dr. Nathan Young
The University of Iowa

The Iowa Flood Center was created in response to the devastating effects of the June 2008 Flood in Iowa. In an effort to increase flood preparedness, inundation maps are being created to identify high risk zones. Charles City is one of the cities in Iowa which sustained major damage during the flood. Ground surface elevations obtained through the use of Light Detection and Ranging (LiDAR) from the United States Geological Survey (USGS) are combined with stream channel depths acquired by a sonar system used by the Iowa Institute for Hydraulic Research (IIHR) and geometric data of bridges and dams to create a digital model of the Charles City area. Flood simulation software then uses the digital model with river flow data from the USGS to simulate flood inundation levels. The results from the flood simulation are then used to create maps for a number of flows. The inundation maps can help mitigate damage resulting from future flood events.



33. Women in Exile: Self-Perception and Arts Education in Correctional Facilities

Rebecca McCray, Iowa City, IA
Major: English
Mentor: Dr. Rachel Williams
The University of Iowa

This poster highlights research results obtained through writing and arts workshops I have facilitated at the Iowa Correctional Institute for Women in Mitchellville, Iowa with Assistant Professor of Art Education, Rachel Williams. Working with the genres of memoir and painting as primary mediums of expression, I spent twelve weeks with a class of women exploring issues of identity, reflection, and self-perception through writing prompts and portrait painting. My research highlights the beneficial effects of providing a safe, non-therapeutic and healthy outlet for expression in an environment that generally discourages creativity.



34. Format Effects in Mental Account of Windfalls

Paige McQueeney, Asbury, IA
Majors: Marketing & Advertising
Mentor: Dr. Laura Smarandescu
Iowa State University

In this research, we examine how the format of a windfall (i.e., cash gift versus gift card) interacts with mental accounting and self-regulation processes to influence budgeting and spending decisions. We show that consumers have difficulty maintaining cash windfalls as distinct mental accounts and provide evidence for an absorption process, in which the format of a windfall influences the extent to which it is absorbed by other mental accounts. Windfalls received in a cash format are partially absorbed by existing accounts, resulting in underconsumption of the windfall. In contrast, gift card windfalls are maintained as distinct windfall accounts and lead to greater incremental consumption. Data from one field study and two laboratory studies suggest that consumers are willing to spend more, violate their budgets, and accept higher prices when shopping with gift cards in comparison to cash gifts.



19. Co-crystallization of Thiophene-based Semiconductors with Carboxylic Acids and Effects on Crystal Packing

Kristin Kester, Jesup, IA
Major: Chemistry
Mentor: Dr. Leonard MacGillivray
The University of Iowa

Materials that consist of semiconductors surround us a well-known example being the silicon chips in computers. A new form of semiconductor is based on flexible materials in the form of organic molecules. Organic semiconductors offer the promise of low cost, flexible electronics. Electronic paper, electronic clothes, flexible solar energy storage devices are all possibilities. The current semiconductor industry is in excess of \$1 trillion. Organic semiconductors will expand this industry considerably, having broad applications. At the University of Iowa, we are working to develop a method to optimize how electric charge runs through organic semiconductor materials. We develop solids known as co-crystals that allow us to place the organic molecules responsible for the movement of electric charge into tailored geometries. More specifically, we use small organic molecules to assemble and preorganize organic semiconductor molecules into geometries most favorable for charge movement. The latest developments of our work will be described.



20. “Surely you can pick him out of the lineup!”: The Effects of Pre-Admonition Suggestions on Lineup Instructions

Melissa Knight, Sioux City, IA
Majors: Psychology & Criminal Justice
Mentor: Dr. Deah Quinlivan
Iowa State University

The study was designed to examine the effects of pre-admonition feedback on an eyewitness' confidence. All participants were given either feedback or no feedback after receiving unbiased lineup instructions. Participants were then asked to make an identification from a target-absent lineup. The feedback participants were in one of three conditions designed to affect their confidence rating. The results show that pre-admonition feedback, even when paired with unbiased lineup instructions, leads participants to be more likely to choose and be more confident in that choice than compared to those participants receiving no feedback. The implications of this study will be discussed.



21. Susceptibility to Deceptive Advertising Among Older Adults

Bryan Koestner, Centerville, IA
Major: Psychology
Mentor: Dr. Natalie Denburg
The University of Iowa

Deceptive and fraudulent advertisers, telemarketers and door-to-door salespeople are notorious for targeting older adults. These deceptive practices can cost older adults money, time, and their psychological health. The current study examines decision-making and reasoning amongst a community sample of seemingly healthy older adults. Two different real-world tasks were performed in this experiment. First, each participant was given the Iowa Gambling Task, a decision-making task using a card selection paradigm where money can be won or lost. Second, each participant viewed a series of real-life advertisements, half of which were deemed deceptive or misleading by the Federal Trade Commission (FTC). After viewing the ads, a series of questions about each advertisement was presented to the participants, focusing on such things as ad comprehension and the participant's likelihood of purchasing the items in real life. The results indicated that a sizable subset of older adults, who performed poorly on the Iowa Gambling Task, were also shown to be deceived by the advertisements that had untrue claims in them. Results from this study will (1) help to identify vulnerable persons; (2) promote public policy; and (3) create new avenues for therapeutic research, to help older adults avoid being taken advantage of or scammed.



22. Contractual Failures in the Coast Guard's Deepwater Program

Michael Kostboth, Gettysburg, SD
Major: Political Science
Mentor: Dr. Matthew Potoski
Iowa State University

This research is a case study of the Coast Guard's Deepwater upgrade program that looks to examine some of the causes of failures for complex contracting. The Deepwater project is a long term re-capitalization program that the Coast Guard planned as a systems-of-systems upgrade and replacement to their existing compliment of assets. They outsourced the project management to a private corporation. When the program began to fail the outsourcing of key oversight duties was blamed for a number of problems in the program, specifically the failed 110'-123' foot upgrades and the development of the Fast Response Cutter which serves as the backbone of the case study.



31. High-Resolution RUC CAPE Values and Their Relationship to Right Turning Supercells

Andy Mair, Eagan, MN
Major: Meteorology
Mentor: Dr. William Gallus
Iowa State University

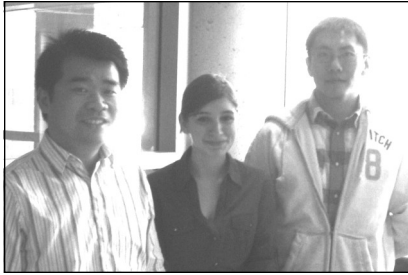
Supercell movement is very important to severe weather prediction. Without knowing the direction a supercell will turn, forecasting where one will go and how to issue warnings becomes much more difficult. In this study, data were collected from supercells during June 2008 across the United States. The 13 km high resolution RUC model was used to find a relationship between turning supercells and CAPE. The results show that CAPE values decrease 1-2 hours before a supercell right turns. The results also show that supercells that turn have a high CAPE value before turning compared to supercells that maintained a straight path.



32. The Impact of the Economic Downturn on Nonprofit Organizations

Kari McCann, Creston, IA
Major: Leisure, Youth, and Human Services
Mentor: Dr. Julianne Gassman
University of Northern Iowa

This presentation will reveal the results of a 2009 study conducted in the Cedar Valley. The goal of this study was to measure the impact of the current economic downturn on nonprofit organizations. Nonprofit organizations participated in a survey regarding financial status and actions taken by their organizations to combat economic hardships. Further, the study examines the impacts of the last recession on the nonprofit sector. This information serves as an indicator of what can be expected in the months ahead. Finally, advice is given to assist nonprofits in preparing for the coming months. With increasing demands on nonprofit organizations it is vital to their success to understand the importance of our economy.



29. The Development of a Novel Zinc Oxide Nanostructure for Use in Dye Sensitized Solar Cells

Carin Lightner, Des Moines, IA
Major: Chemical Engineering
Mentors: Dr. Liang Dong & Haifeng Yang
Iowa State University

Dye Sensitized Solar Cells (DSCs) have great potential to reduce the costs of solar energy and help provide for increasing energy needs. Though efficiencies of DSCs have improved significantly since they were first conceived in 1991, further research is needed before they can be considered a viable alternative to conventional silicon solar cells. We demonstrate the synthesis of a novel ZnO nanostructure developed for use in DSCs. First ZnO fibers were produced by electrospinning and subsequent calcination. ZnO nanoparticles were attached to the fibers and ZnO nanorods were grown on the fibers via a chemical synthesis method. The effect of the growth parameters on the nanorod structure was studied using X-Ray Diffraction (XRD) and Scanning Electron Microscopy (SEM). The development of a new ZnO nanostructure opens further avenues of research in dye sensitized solar cells and nano/micro-electronic applications.



30. D⁰ Meson Decay Vertex Reconstruction Simulations in the PHENIX Silicon Vertex Detector

Matthew Lockner, Lohrville, IA
Major: Physics
Mentor: Dr. Craig Ogilvie
Iowa State University

The Silicon Vertex detector (VTX) is an upgrade project for the PHENIX experiment at the Relativistic Heavy-Ion Collider (RHIC) at Brookhaven National Laboratory, NY. This upgrade is a large-scale collaborative project, budgeted at approx. \$9 million, involving more than 500 researchers in over 70 institutions spanning the globe. RHIC performs high-energy collisions of gold ions, providing experimental data on the "quark-gluon plasma," a state of matter thought to exist within the first microsecond following the Big Bang, in which quarks are deconfined rather than bound in hadronic matter. The VTX upgrade will increase our ability to diagnose the properties of the plasma. We describe the main physics goals of the VTX and the expected performance of the device after it is installed in late 2010.



23. Ryerson's Woods Park: A Relict Woodland?

Sophia Krajewski, Iowa City, IA
Major: Biology
Mentor: Dr. Diana Horton
The University of Iowa

Ryerson's Woods is a wooded, 49 acre Iowa City park bisected by a deep ravine. It is well known locally for its showy spring flora, diversity of ferns and other unusual species. The purpose of our research is: 1) to document occurrence of plant species with collections and assess frequency of individual species in each habitat, and 2) to compare the present-day vegetation with that at the time of European settlement based on analyses of the 1837 land survey records. Over the 2009 growing season, extensive weekly field surveys, including pressed specimens and quantitative analyses, document high species diversity and a number of rare/infrequent species, particularly in the ravine. The historical records reveal the present-day wooded upland was open prairie or savanna with scattered burr, black and white oaks. The floodplain east of the park was densely treed with diverse species, and it is likely the ravine bottom and slopes harbored extensive patches of ferns, Wild Sarsparilla and Spikenard shaded by trees much as they are today. Our data suggest Ryerson's Woods could be a good candidate for state preserve status.



24. Polychronic Technology Usage: Understanding Intra/Intergenerational Variation of Multitasking in Diverse Groups

Brandon Kramer, Dyersville, IA
Major: Sociology
Mentor: Dr. Mary E. Campbell
The University of Iowa

Polychronicity, or the preference for doing more than one thing at a time, has become a prominent aspect of contemporary life since the advent of technological advancement. Related temporal phenomena, most notably media-multitasking, are largely unstudied and misunderstood. Two conceptual models, a Temporal Imagination Model as well as the Polychronic Context Continuum, are presented and elaborated for integration into future research regarding multitasking and polychronicity. This research explains considerable differences both inter- and intra-generationally on a multitude of personality and social variables. Using a diverse sample of 1,319 participants, the study analyzes nine variables related to media-multitasking preferences and time practices. Results of this study demonstrate those with fewer social limitations (i.e. those living alone or with less social responsibility) are more likely to multitask. Those who spent more hours on the internet, playing video games, and listening to music also showed significant relations with elevated multitasking. Additionally, results demonstrated that participants preferred face-to-face interaction over any alternative social interactive technology method in informal networks, where preferences throughout formal networks were largely role dependent.



25. New Integrated Pest Management Systems for Apple Orchards in the Midwest

Rachel Kreis, Waterloo, IA
Major: Horticulture
Mentor: Dr. Mark Gleason
Iowa State University

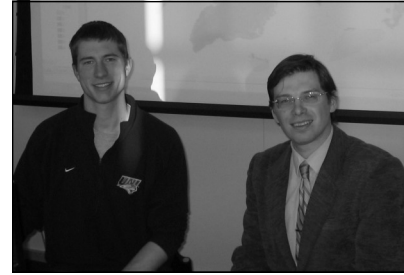
Apple growers in the Midwest must manage a wide range of pests such as codling moth, sooty blotch and flyspeck, apple scab, and weeds. Four pest management systems were investigated on three apple scab-resistant cultivars (Redfree, Liberty, and Gold Rush) in an Iowa orchard. My project carries out the third year of this 3-year (2007-2009) study. A conventional system of calendar-based pesticide sprays was compared to a current integrated pest management (IPM) system and two new IPM systems using weather based disease-warning systems and alternative pesticides. The study also evaluated the ability of composted bark mulch to reduce the need for herbicide sprays in controlling weeds.



26. Guidelines for Developing an Academic Acceleration Policy

Emily Ladendorf, Ballwin, MO
Major: Psychology
Mentor: Dr. Maureen Marron
The University of Iowa

Academic acceleration is an educational intervention in which high-ability students progress through school at rates faster or ages younger than typical. Acceleration helps match the level, complexity, and pace of the curriculum with the student's intellectual abilities. Students demonstrate academic success and social-emotional development whether accelerated in one content area or for an entire grade. Many school districts, including some in Iowa, lack a policy that addresses the value of acceleration or describes procedures to be followed in making decisions about acceleration. Without an acceleration policy, high-ability students may not receive equitable educational opportunities. For my 2009-2010 ICRU Research Fellow award, I supported the development of Guidelines for Developing an Academic Acceleration Policy, a document intended to assist schools in writing and modifying acceleration policy so that all students have appropriately challenging curricula. In the Guidelines document, we define accelerative options, review the research evidence in support of acceleration, provide an overview of recommended acceleration policies, and explore in practical terms how these policies can be implemented. My work on Guidelines was an extension of my contributions to the IRPA website, which serves as a clearinghouse of information on acceleration to parents, educators, and the general public.



27. Using Geospatial Technology and Dasymetric Technique to Improve Pheasant Population Mapping in Northwest Iowa

Jonathon Launspach, Iowa City, IA
Major: Geography
Mentor: Dr. Andrey Petrov
University of Northern Iowa

Accurate mapping of pheasant population in Iowa is necessary for managing conservation and hunting activities. The dasymetric mapping approach was used to produce more accurate pheasant population density maps of the Northwest corner of Iowa, which has the largest pheasant population in the state. In this project the dasymetric method is deployed to more accurately demonstrate where the pheasant population is more prone to be found. Two dasymetric techniques were implemented: binary and population fraction. The binary method was used to refine pheasant density maps by identifying the feeding and nesting areas of the pheasants, which make up their habitat. The population fraction method used inhabitation probability weights to calculate expected pheasant densities based on suitability of each land cover type for pheasant habitation. The pheasant population and land cover data were obtained from the Iowa DNR. Both dasymetric maps are more consistent with the inhabitation preferences of pheasants and, thus, provide more accurate information on pheasant population density to hunters and conservation specialists.



28. Is Personality in the Eye of the Beholder? Discrepancies Between Self-reported and Objective Ratings of Adaptive and Maladaptive Personality Traits

Jonathan Lewis, Iowa City, IA
Majors: Economics & Psychology
Mentor: Dr. Lee Anna Clark
The University of Iowa

Current personality measures rely heavily on self-report, which are necessarily subjective, that is, based on individuals' self-views. This study uses a new measure, the Schedule for Personality Assessment from Notes and Documents (SPAN-DOC) to investigate whether 26 personality traits (e.g., mistrustfulness, impulsivity) can be assessed reliably from information in psychological-clinic clients' files, such as clinicians' reports of clients' intake interview, and how much SPAN-DOC ratings agree with clients' self-rated personality test scores. The study also examines how traits that SPAN-DOC measures are interrelated. Differences between self- and other-report previously have been found for the broad trait of Disinhibition, which encompasses whether people are carefree and spontaneous, act impulsively, and are easily distracted, or are more planful and focused on specific goals, so this study highlights Disinhibition. Study findings may help to improve the validity of personality assessment in clinical settings. This project provides data of use in the ongoing revision of the Diagnostic and Statistical Manual for Mental Disorders. Specifically, the study's findings will increase understanding of how best to assess personality trait dimensions, which are important in diagnosing personality disorder. This will improve the validity of personality assessment in clinical settings and help clients understand their own personalities better.