WILSON COLLEGE
1869
WITH CONFIDENCE

First Annual
Student Research Day
Harry R. Brooks Complex for Science, Math and Technology Auditorium
April 23, 2010

9:00 a.m.

Serenity Franklin
The Influence of Status and Physical Attractiveness on Female Mate Selection (Psychology, Beverly Ayers-Nachamkin)

Travis Tosten, A Different Proof for Pi (Mathematics, Karen Adams)

Jacquelyn Aleece Valencia
"Life as a Labyrinth" chapbook of poems (English, Michael Cornelius)

Sarah (Weikert) Wilson
American and the Sublime: Nineteenth-Century Landscape Art and the Transformation of an Aesthetic Concept (Fine Arts, Robert Dickson)

10:30 a.m. Break

10:45 a.m. **Physical and Life Sciences**

Susan Davies
Pseudomonas syringae as a Distributor and Vector for Escherichia coli in Spinacea oleracea (Biology, Bradley Engle and Laura Altfeld)

Bobbie Ditzler
Temperature Effects on the Seasonal Polyphenism for Melanization of Papilio polyxenes Larvae (Biology, Bradley Engle and Deborah Austin)

Capulet Williams
Detectable Limits of Blood Using Luminol following Exposure to the Extreme Heat of Fire (Chemistry, Deborah Austin and Catherine Santai)

12:00 p.m. **Lunch in Dining Hall**

1:00 p.m. **Poster Session** in first floor atrium outside Science Complex Auditorium featuring students in Media and Society (MCM 304), Kayla Chagnon, Laura Hans, Janessa Demeule, Xiaomeng Li, Colleen Seidel, Jacquelyn Valencia, Power and Politics: Demonstrating Communication Theory (Mass Communication, Aimee-Marie Dorsten)

Disert Scholar Presentation

Mariza Lakmini Shehara Cooray: The Impact of Received Remittances on Savings Behavior: An Inquiry into the Savings of Hatton National Bank Microloan Borrowers Using Experimental Methods (International Relations and Economics, Abdolreza Banan)

Abstract: This thesis studies savings behavior by examining the savings accounts of microloan borrowers who receive remittances. Relevant literature indicates that the incomes of rural Sri Lankan households are particularly dependent on remittances which are sent by their families. In collaboration with Hatton National Bank (HNB) of Sri Lanka, a private commercial bank with microfinance services, I investigate whether remittance-receiving borrowers were more likely to save than borrowers who did not receive remittances. The statistical results confirmed that borrowers who received remittances are likely to save and invest more. I suggest a model savings product for microfinance institutions while contributing to the theoretical framework related to habitual savings behavior.

1:15 p.m. **Honors in the Major candidates**

Elsa Natalia Hilario Camuamba
Mobilizing the Developmental Impasse in sub-Saharan Africa: Promotion of Agricultural Productivity through Inward-and-Outward Economic Integration (Economics and International Business, Abdolreza Banan)

Nikola Grafnetterova
Leadership, Women, and Athletic Participation: Are Female Students Attending Women's Colleges Less Susceptible to Stereotype Threat than Students from Coeducational Institutions? (Sport Management and Psychology, Lori Frey)

M. Heather McCoy
Community Gardening as a Pathway for Civic Engagement of Youth (Sociology, Julie Raulli)

Bemnete E. Tadesse
Morphometric Analysis of Interlobular Renal Arteries of Spontaneously Hypertensive Rat Pups Born to Mothers Treated with Methylphenidate Prior to and During Pregnancy (Biology, M. Dana Harriger and Catherine Santai)

3:00 p.m. Break

3:15 p.m. **Disert Scholar Presentation**
Mariza Lakmini Shehara Cooray
The Impact of Received Remittances on Savings Behavior: An Inquiry into the Savings of Hatton National Bank Microloan Borrowers Using Experimental Methods (International Relations and Economics, Abdolreza Banan)

4:00 p.m. **Reception for Disert Scholar following**

Bemnete E. Tadesse: Morphometric Analysis of Interlobular Renal Arteries of Spontaneously Hypertensive Rat Pups Born to Mothers Treated with Methylphenidate Prior to and During Pregnancy (Biology, M. Dana Harriger and Catherine Santai)

Abstract: Methylphenidate, d-MPH, the active ingredient in Ritalin®, is prescribed for Attention Deficit Hyperactivity Disorder - ADHD. A tissue distribution study in rats localized d-MPH to the kidneys, and teratogenic studies have shown that d-MPH crosses the placenta. This study utilized Spontaneously Hypertensive Rats, SHRs, and Wistar Kyotos to investigate if *in utero* exposure to d-MPH contributes to anomalies of interlobular renal arteries. SHR dams received d-MPH at 10.0 mg/kg body weight daily prior to and during their pregnancy. SHRs treated with d-MPH had significantly elevated blood pressure and heart rates in comparison to SHR and Wistar controls ($p<0.05$). Kidney length, height and width to body length ratio were performed. A significant increase in kidney height to body length ratio was determined in SHR treated group compared with Wistar controls ($p <0.05$). Kidney sections were digitized and comparative morphometric analyses were performed on the interlobular arteries including; total, luminal and medial arterial cross sectional areas. These parameters are expected to be increased in the pups of SHRs treated with d-MPH in comparison with control.

Nikola Grafnetterova: Leadership, Women, and Athletic Participation: Are Female Students Attending Women's Colleges Less Susceptible to Stereotype Threat Than Students from Coeducational Institutions? (Sport Management and Psychology, Lori Frey)

Abstract: This study explored whether women attending women's colleges would be less vulnerable to stereotype threat than women attending coeducational institutions and whether female student-athletes would choose to be leaders more often than non-athletes. Chi square analysis did indicate a significant difference when comparing student-athletes to non-athletes in their leadership choices.

M. Heather McCoy: Community Gardening as a Pathway for Civic Engagement of Youth (Sociology, Julie Raulli)

Abstract: A children's community gardening project is examined as a possible pathway to civic engagement for youth. Though it is concluded that community gardening is a potential means of integrating young people into social processes typically reserved for adults, a number of internal and external barriers to civic engagement are identified.

WILSON COLLEGE
1869
WITH CONFIDENCE

First Annual
Student Research Day
Abstracts
April 23, 2010

Serenity Franklin: Status, Physical Attractiveness and the Impact of Relationship Context on Female Mate Selection (Psychology, Beverly Ayers-Nachamkin)

Abstract: Ninety-eight female participants were randomly assigned to one of two relationship context conditions and asked to choose between two hypothetical potential mates. Scenarios described the males who varied on two competing sets of characteristics: attractiveness/vitality, and status/resources. As predicted, female participants rated attractiveness/vitality as more important than status/resources in a short-term relationship.

Travis Tosten: A Different Proof for Pi (Mathematics, Karen Adams)

Abstract: Ivan Niven proves π to be irrational by method of contradiction. He allows $\pi = \frac{a}{b}$ and contrives the two formulas $f(x) = \frac{x^n (a - bx)^n}{n!}$ and $F(x) = f(x) - f^{(2)}(x) + f^{(4)}(x) - \ldots + (-1)^n f^{(2n)}(x)$. Using those two formulas, he proves that $f(x)\sin x$ is both an integer and that $0 < \int_0^{\pi} f(x)\sin x < 1,$ which is a contradiction; thus proving π irrational. It is demonstrated here that, by using the same method of contradiction and set of initial conditions, $f(x)$ and $F(x)$, $f(x)\cos(\frac{x}{2})$ is both an integer and that $0 < \int_0^{\pi} f(x)\cos(\frac{x}{2}) < 1.$ Thus, again, proving π to be irrational.

Jacquelyn Aleece Valencia: "Life as a Labyrinth" chapbook of poems (English, Michael Cornelius)

Poster Session

MCM 304 Students: Kayla Chagnon, Laura Hans, Janessa Demeule, Xiaomeng Li, Colleen Seidel, Jacquelyn Valencia (Mass Communications, Aimee-Marie Dorsten)

Honors in the Major Theses Candidates

Elsa Natalia Hilario Camuamba: Mobilizing the Developmental Impasse in sub-Saharan Africa: Promotion of Agricultural Productivity through Inward-and-Outward Economic Integration (Economics and International Business, Abdolreza Banan)

Abstract: Of all the regions of the world, sub-Saharan Africa faces in the new millennium the most daunting of development challenges. Despite the role of agriculture as the backbone of most economies in the region, agriculture remains marginalized and its proper role in the development of sub-Saharan African economies has been subjected to a strong wave of pessimism. Accordingly, this thesis aims to challenge this prevailing 'agro-pessimistic' view and reappraise agriculture's continued credibility as a framework upon which to tackle some of the emergent challenges to development. The study provides a comprehensive analysis of the structural factors – external and internal – hampering agricultural productivity in the region and reveals how these factors are particularly important in understanding 'risk-averse behavior' among sub-Saharan African farmers. I conclude by proposing a trade model based on regional integration that combines inward-and outward-oriented policies as a strategy for promoting agricultural productivity and regional development.

Key Words: *agro-pessimism, urban bias, subsistence farming, structural factors, agricultural productivity, Doha round, trade creation, and trade diversion.*

Capulet Williams
Detectable Limits of Blood Using Luminol Following Exposure to the Extreme Heat of Fire **(Faculty Advisors - Deborah Austin and Catherine Santai)**

Abstract: Luminol, which produces chemiluminescence upon oxidation, is frequently used to detect blood at a crime scene as only one part per million (ppm) of blood is necessary for a detectable signal. Forensic scientists and law enforcement officers often encounter situations where attempts have been made to cover up or destroy evidence by the use of arson. In this study, the detection limit of blood following exposure to the extreme heat of fire was investigated. Fluorimetry was utilized to determine whether the intensity of chemiluminescence was linearly related to the concentration of blood. A linear relationship was observed between chemiluminescence intensity and blood concentration. Blood at various dilutions (0.01 ppm – 100 ppm) was then qualitatively analyzed before and after exposure to heat. In addition, a controlled burn of wood pallets treated with the same dilutions of blood was done in cooperation with the Franklin County Public Safety and Fire Training Center to examine the effects of the extreme heat of fire. The pallets were then treated with luminol and examined qualitatively and quantitatively using a digital fluorescence imaging system. A visibly detectable signal was observed at 100 ppm on two of the three fire exposed pallets.

Sarah R. (Weikert) Wilson: America and the Sublime:
Nineteenth-Century Landscape Art and the Transformation of an Aesthetic Concept **(Fine Arts, Robert Dickson)**

Abstract: The nineteenth century was a time when Americans were developing national culture, and at their doorstep were elements of the sublime in the natural landscape. In the American wilderness, settlers confronted inhabitants' real fears of death. Yet the American people embraced challenge, and they explored and studied the natural world they lived in. Much of what they understood about the new landscape was influenced by earlier philosophers and writers who focused on the concept of the sublime, such as the ancient Greek philosopher Longinus as well as England's Edmund Burke and Germany's Immanuel Kant. These philosophers laid the groundwork for nineteenth century artists by describing the concept as a feeling that relates to the experience of death. Thomas Cole, the first American artist to study the sublime through painting, depicted natural disasters through personal and national narratives during the first half of the nineteenth century. Later, artists of the Luminist school took on the idea of the sublime as it evolved to describe the national personality of America. Writer Ralph Waldo Emerson and the Transcendentalists also had a large impact on the change of the definition of the sublime from the experience of death to the spiritual understanding of the concept. The new insight of the sublime no longer required a special level of intellect but the practice of awareness of the viewer's surroundings. This change was supported by the incredible landscape of the American wilderness and the artists who depicted it. The inhabitants used their understanding of the sublime to fashion their religious, political, and aesthetic beliefs and to create an American culture.

Physical and Life Sciences

Susan Davies

***Pseudomonas syringae* as a Distributor and Vector for *Escherichia coli* in *Spinacea oleracea* (Faculty Advisors: Brad Engle and Laura Altfeld)**

Abstract: Outbreaks of foodborne pathogens on leafy vegetables have become a health concern for humans and animals. The purpose of this study was to determine if the bacterial plant pathogen, *Pseudomonas syringae*, increases or alters the distribution of *E. coli* on the surface of spinach leaves and/or facilitates the entry of *E. coli* into plant tissues through the stomata. Three groups of spinach plants (untreated, *E.* coli, and *E. coli/P. syringae*) were housed in environmental growth chambers under standardized conditions (light, temperature, humidity and CO_2). Plants were inoculated via top misting (*E. coli* 10^4 CFU/ml; *P. syringae* 10^5 CFU/ml), and leaves were collected for observation, testing and analysis at three and seven days after inoculation. Bacterial concentrations (surface, internal and total leaf) were determined using serial dilution plating techniques. Results from this study indicate that in the presence of *P. syringae,* a plant pathogen, amounts of *E. coli* on and in spinach plants were higher than when the plant pathogen was not present. These findings support the hypothesis that *P. syringae* biofilms and the ability of *P. syringae* to open the stomata may be the mechanisms that help *E. coli* stay on and gain access to the interior tissues of the plant by way of the stomata.

Bobbie Ditzler

Temperature Effects on the Seasonal Polyphenism for Melanization of *Papilio polyxenes* Larvae (Faculty Advisors: Brad Engle and Deborah Austin)

Abstract: Seasonal polyphenisms are expressed based on environmental cues perceived by an organism. *Papilio polyxenes,* the black swallowtail butterfly, displays a seasonal polyphenism induced by cooler temperatures and shorter photoperiods resulting in darker pigmentation of mature larvae. This research examined whether a decrease in temperature during a specific stage of early instar development produced a more pronounced enhancement of melanization. Fertilized eggs will be collected, placed in individual growth chambers (food source provided), and incubated at 30^{o}C (humidified conditions; 14/10 light/dark cycle) during larval development. Five groups of larvae, one for each of the five instars, will be exposed to a cooler temperature (20^{o}C) during one stage of molting. All larvae will be allowed to complete the maturation process before they are collected, measured, weighed and photographed with a digital imaging system. Grayscale images will be used to quantify the degree of pigmentation and results will be analyzed to determine if there is a correlation between cooler temperature, instar development, and degree of pigmentation. The results of this study may lead to a better understanding of this adaptive trait and how species that display seasonal polyphenisms may be influenced by climate change.