A Celebration of Excellence

Abstracts from the 4th Annual Celebration of Excellence
Student Presentations and Poster Sessions
Friday, April 25th, 2014
PRESENTATIONS

Zipporea Abdulmalik
Faculty Sponsor: Nancy Taylor Porter
Aristophanes and Ancient Athenian Women

This paper examines the contrast between ancient Athenian women's actual lives and how they were depicted by the comic playwright, Aristophanes. Athenian women were restricted to domestic duties and were essentially imprisoned in the home. His plays *Women in the Assembly* and *Lysistrata* are two examples of works that both depict and ridicule the Athenian culture, which he achieves largely through the actions of the female characters. I describe the treatment, traditions, and restraints of Athenian women, and then connect those to how Aristophanes portrayed women who both rebelled against and followed their culturally prescribed positions.

Art Department
Faculty Sponsor: Jeff Garland
Multi-Modal Student Art Show

In this Art Department showcase, students from multiple disciplines are exhibiting work in different modes: installation, performance, paper presentation, and a gallery exhibit. Their work demonstrates versatility in subject, medium, and style. Many times in an art show, the viewer is left wondering or confused about work that they have reacted to but could not quite understand. A presentation about the piece would've benefited both the artist and viewer. This showcase includes presentations by the performance and installation artists.

Doug Allgaier, Korrie Edwards and Amibeth Thompson
Faculty Sponsor: Jeremy Turner
Acoustic Diversity as a Metric of Biodiversity

Measuring biodiversity remains one of the most urgent yet challenging tasks confronted by ecologists and conservation biologists (Seuer et al., 2008). Traditional biodiversity measurements consist of costly, slow, narrowly focused, and often invasive manual species counts. Here we tested an alternative approach to estimating biodiversity in a community by measuring the acoustic variability. Mammals, birds, amphibians, and insects make a rich variety of sounds by movement in their environment and by their communication calls. Acoustic measurements provide many benefits to estimating biodiversity. They can be made with minimal intrusiveness on the environment, can be collected during dark phases when many living things are most active, and can be used to measure organisms that can be difficult to see but easy to hear (e.g., birds, bats, insects). Hour-long environmental acoustic measurements were collected from five different locations at both dawn and dusk with varying amounts of human traffic on the University of Georgia’s Campus in San Luis, Costa Rica. We hypothesized that more remote areas with lower daytime human traffic would have more acoustic diversity at dawn and dusk. Our data will help determine whether acoustic diversity can be used as a metric for estimating biodiversity.

Toluwalope Babington
Faculty Sponsors: Kevin Klein and Winston Wells
On the Road to Recovery – Economic Development in Cambodia

Cambodia is a least developed country (LDC) in Southeast Asia that has experienced high levels of economic growth for about a decade. Owing to the ongoing globalization, there is an increase in the interdependency of the economies of the nations of the world. As a result, there is a need to bridge the gaps in economic development across nations. Furthermore, successful and sustainable economic
development helps to address the multifaceted problem of inequality plaguing many people in today’s world. The purpose of this paper is to support the claim that Cambodia will not remain a least developed country for much longer if current economic growth patterns remain unchanged. This will increase its effectiveness in the international market thus increasing global economic development.

Claire Barclay
CLAIRE H. BARCLAY, DOUGLAS E. ALLGAIER, LAWRENCE W. ZETTLER. Orchid Recovery Program, Illinois College, USA.

Faculty Sponsor: Lawrence Zettler
New Records of Mycorrhizal Fungi from the Federally Threatened Eastern Prairie Fringed Orchid, Platanthera leucophaea, from Illinois, Michigan, and Wisconsin

Once widespread across the Midwest, the Eastern Prairie Fringed Orchid, Platanthera leucophaea (Orchidaceae), has experienced long-term decline mostly from habitat loss and poaching. In 2007, 79 extant populations were known of this orchid, but only 28% of these sites were afforded legal protection. Given that orchids are highly sensitive to habitat changes, they are especially vulnerable to environmental degradation placing a heavy burden on existing populations. In nature, all orchids require the presence of mycorrhizal fungi to facilitate seed germination leading to spontaneous seedlings. As habitats change, there is a serious concern that the fungal community will also change, including the fungi that orchids rely upon for survival. Consequently, isolating, identifying, and safeguarding mycorrhizal fungi in existing habitats is of paramount importance for the conservation of species like P. leucophaea. We report new records of mycorrhizal fungi isolated from P. leucophaea from populations in Illinois, Michigan, and Wisconsin acquired during a three year period. Most of these fungi were identified as assignable to the anamorphic genus Ceratorhiza, and were deposited into the University of Alberta Micofungus Collection and Herbarium in Canada (UAMH) for safekeeping. Three of these fungal strains facilitated seed germination of P. leucophaea in vitro, confirming that these fungi are of physiological significance to the orchid.

Lynette Bauer
Faculty Sponsor: Elizabeth Rellinger Zettler
Academic Self-Esteem, Adjustment to College, and Academic Success among First-Generation College Students: The Effects of the TRiO Program

Many researchers have documented that first-generation college students (FGS) face a number of obstructions on their journey toward a degree including conflicting obligations, inaccurate expectations, and a lack of preparation or support. While the transition for FGS is often especially difficult during the first semester, successful acclimation can be enhanced by the institutional environment. The Illinois College TRiO program is designed specifically to help FGS make a successful transition to college. This project on attitudes towards learning, academic self-esteem, adjustment to college, and academic success at Illinois College was conducted to partially assess the effectiveness of the TRiO program. Based on previous research and the goals of the TRiO program, it was hypothesized that: 1) FGS will have a more difficult transition to college than students who had at least one parent who completed college. 2) Among FGS, those who participated in the TRiO program will report higher academic self-esteem and better academic success than students who were not in the TRiO program. To test these hypotheses, 119 students were asked to complete an academic self-esteem inventory, the College Adjustment Test, and demographic questions. In addition, academic data which included high school and college GPA and ACT scores were collected.

Brandon Berry
Faculty Sponsor: Mary Marshall
Statistical Analysis of Basketball through APBRmetrics
In recent years, professional sports have seen a shift towards the prevalent use of statistical analysis. In particular, baseball has seen a statistical explosion due to the recent success of the use of Sabermetrics, as seen in the book and film *Moneyball*. The focus of this research will be in the cousin study of Sabermetrics, the Association for Professional Basketball Research (APBRmetrics). APBRmetrics focuses on offensive and defensive efficiency ratings to evaluate player and team success. This presentation will focus on the success and relevance of different APBRmetrics statistics. In addition to offensive and defensive efficiency ratings, other statistics will include shooting percentage variations as well as team record projections. All previously mentioned analytics will be explained and calculation methods will be discussed. The final portion of the presentation will be spent analyzing specific professional and Illinois College basketball players utilizing APBRmetrics.

**Sovit Chalisé**  
**Faculty Sponsor: Mary Marshall**  
Bayes’ Theorem and its Applications

Bayes’ Theorem of Probability provides a formula to find the conditional probability of an event A given that another event, B, has already occurred; this conditional probability is denoted as $P(A|B)$. For example, Bayes’ Theorem can be used to find the probability that a person tests positive for a staph infection given that he doesn’t have the active infection, and it can also be used to calculate the probability that the person does have the active infection given that he tested positive for it. At present, Bayes’ Theorem is applied to various fields. For example, in the book *Numbers behind Numb3rs*, author Keith Devlin mentions several applications of Bayes’ Theorem to solving crimes. My presentation will include Bayes’ Theorem, its proof, its history, and its applications.

**Sovit Chalisé**  
**Faculty Sponsor: Laura Corey**  
Detection of the Common Commercial Orchid Pathogen Cymbidium Mosaic Virus (CymMV) in a Wild Orchid in The Florida Panther National Wildlife Refuge

The Orchidaceae is the largest and most diverse plant family and includes species both of great commercial and economic importance. Interest in orchids engendered by collections of commercially produced specimens increases support for conservation of wild orchids. However, commercial orchid production can also threaten wild orchid populations through the spread of common pathogens by insect vectors. The Florida Panther National Wildlife Refuge in the Big Cypress Basin ecoregion of Collier County, FL is home to many threatened orchid species found nowhere else in North America. Using the Enzyme-linked Immunosorbent Assay (ELISA), we have verified that two common orchid pathogens, Cymbidium mosaic virus (CymMV) and Odontoglossum ringspot virus (ORSV), are present in local commercially-produced orchids. We have begun a survey of orchids in the Refuge and have identified one specimen of the Florida Butterfly Orchid (*Encyclia tampensis*) that is positive for CymMV. We will expand our survey to other plants in the area.

**Jacob Dander**  
**Faculty Sponsor: Brent Chandler**  
Synthetic Efforts to Prepare the Anti-Cancer Agent Xenitorin A

Xenitorins A-F were isolated in 2002 from the Formosan soft coral *Xenia puerto-galerae*. Xenitorin A demonstrated potent cytotoxicity against A549 (lung) cancer cells with an ED50 of 0.79 mg/mL. Despite its potency as an anticancer agent and its relative scarcity, a successful synthesis of this valuable compound has not been reported. We hope to provide access to this molecule and its relatives in order to understand and improve its potency. We believe through the utilization of a cysteine-based catalyst, we
can develop a catalytic, asymmetric Rauhut-Currier reaction, which would provide an advanced starting material for the eventual synthesis of xenitorin A. The development of this methodology would provide the chemical community with a new procedure for the synthesis of enantio-enriched cycloenone products. Our work thus far has focused on the preparation of an acyclic diene, dione precursor upon which we may test our proposed Rauhut-Currier transformation. This talk will outline initial synthetic attempts to prepare the acyclic precursors upon which our proposed tandem Rauhut-Currier/Aldol condensation will be performed.

Ira Dawson, Hannah Grandt, Jameelah Harrison, Brittany Spaulding, Katia Swane-Barzowski, Wilson Webel, Patrick Winters
Faculty Sponsors: Cynthia Cochran and Megan Milks

Creative Writing Showcase

Students from Creative Writing courses English 207 and English 307 will showcase their creative works. Each presenter will read for 5 minutes. There will be a brief 8-10 minute period for questions from the audience.

Leadership Program
Faculty Sponsor: Karen Dean
Leadership across the College

This session focuses on a variety of leadership activities and projects, with a special focus on the work of graduating seniors, Bret Thixton and Kathryn Stroud. In addition, leadership student, Paige Graham, shares her research on racism. The College's recent affiliation with the Clinton Global Initiative-University Network (CGI-U) and the first steps of the institutional human rights service project, "Freedom Then/Freedom Now," is show cased in poetry, video, and several of the group projects conducted in the Introduction to Politics class as its student leaders build the project for next fall.

Meagan Donahue
Faculty Sponsor: Mary Marshall
The Monty Hall Problem

In 1963, Monty Hall’s face appeared on television screens across the nation as the host of the new game show *Let’s Make a Deal*. When the show first aired, the common notion provided by the general public was that the game was based on luck, and that no strategy could be devised to yield higher quality prizes. The Monty Hall problem, a famous probability puzzle, truly contradicts the opinion of the general public. The Monty Hall assertion contends that when given the opportunity to choose between three doors, one of which conceals a noteworthy prize, that the player should act counter-intuitively. That is, if a player chose Door 2 as their initial selection, Monty Hall would open one of the other doors, perhaps Door 3. Thereafter, Monty Hall would give the individual the option to change their selection from Door 2 to Door 1. And though it seems illogical, the player has a higher chance of winning if he/she does switch doors. My paper focuses on the mathematical mechanisms, specifically probability, that underlie the very foundation by which the Monty Hall problem arose.

Tom Farmer
Faculty Sponsor: Jeremy Alm
The Erdős-Soifer Conjecture
In this talk, we consider a subproblem of a tiling problem originally posed by Erdős and Soifer. Let \( T \) be a tiling of the unit square by squares. We say that \( T \) has the minimal tile property whenever every tile in \( T \) can itself be tiled by the smallest tile in \( T \). Let \( \psi_4(n) \) denote the maximum of the sum of the side lengths of tiles in \( T \), where the maximum is taken over all tilings \( T \) with the minimal tile property that contain \( n \) or fewer tiles. We determine \( \psi_4(n) \) for some small values of \( n \), and pose some questions.

**Tom Farmer**  
**Faculty Sponsor: Mary Marshall**  
**The Mathematics of Cryptography**

Since the inception of recorded data, there has been a need to secure that data with methods that obscure the meaning of the data. Although these methods for encryption lie primarily in the field of computer science, their foundations rest firmly on the bedrock of mathematics. One way mathematics is used in encryption is by taking advantage of large integers that are difficult to factor into primes. There are several other similar tasks that are known to be virtually impossible to solve. These are the methods that make decryption infeasible. In my talk I will discuss the mathematical underpinnings of the field of cryptography, specifically focusing on Discrete Logarithm Schemes and Elliptic Curve Schemes. The security of these schemes is seated on the Discrete Logarithm problem that stems from Group Theory.

**Ryan Flynn**  
**Faculty Sponsor: Jenny Barker-Devine**  
**The Hood Is on Jacksonville: The Ku Klux Klan in Morgan County, 1922-1933**

My paper focuses on the often overlooked period in Jacksonville, Illinois history during the 1920's and early 1930's, when the Ku Klux Klan worked its way into the community. For the first time, I have compiled a detailed overview of the Klan’s activities in the area that occurred between their founding in July of 1922 to their dissolution in the early 1930's. Using materials from the Illinois College Archives and the *Jacksonville Journal Courier*, I have been able to contribute to a timeline of events that will be a launching point for further research on the Klan in Jacksonville, Illinois.

**Logan Giesing**  
**Faculty Sponsor: Nancy Taylor Porter**  
**Reconstructing Ancient Greek Staging Practices of *Lysistrata***

This paper examines how the play *Lysistrata* may have been performed based on what we know about ancient Greek theatre architecture from examining ruins and performance practices from scholarly research of written and visual primary sources. It also examines possible gestures and body positions of performers based on similar interactions depicted on vase paintings, while cautioning against definitive judgments given the conventions governing this form of visual art at the time. A more solid basis of staging can be drawn from close analysis of textual clues. While we do not have any irrefutable evidence as to how a production may have been staged, by delving into the different areas of Greek theatre, we are able to make knowledgeable assumptions as to the staging process of this famous Greek comedy.

**Amanda Henton**  
**Faculty Sponsor: Jeremy Turner**  
**The Effects of Reinforcement on Risk-Behavior**
Previous research suggests that success in a gambling-related task can increase risk taking behavior in subsequent tasks (Demaree, 2009). Based on this research, we hypothesized that individuals receiving higher rates of reinforcement would score higher on a risk analysis. To test this hypothesis, participants were asked to decide whether a group of letters presented to them formed a word. While completing this task, participants received varying rates of reinforcement, in the form of encouraging words that were displayed on the screen. The rates of reinforcement were predetermined (never, after every fifth trial, and after every second trial) and were not dependent on the participants’ individual performance. Risk behavior was then measured using the Balloon Analog Risk Task (Lejuez et. al, 2002). This test prompts students to click on a box. With each click, an image of a balloon inflates and the participant earns points. The participant may choose to collect the points from the balloon at any time, however; the balloon is set to explode at random intervals. If the explosion occurs, the participant loses all points. It was expected that participants that received the higher rates of reinforcement would make riskier choices in the Balloon Analog Risk Analysis.

Jeremy Hommowun
Faculty Sponsor: Tim Kramer
The Beat of My Drum: Exploring the Construction and Culture of the Djembe

Through designing and creating a musical instrument, a musician learns not only about that instrument, but also about the culture that surrounds that instrument. Over the past eight months I have been doing just that, carving my djembe and learning about the musical culture from which it originates. Taking a step back to the Mali Empire in the 11th century, the djembe was a specialty instrument that was unknown to musicians outside West Africa. In the 20th and 21st centuries, the djembe has become more mainstream and thus it is more commercialized and easier to obtain. Even though this is the case, the respect and understanding that comes with designing and carving my own djembe gave me a deeper understanding and appreciation for an art that has been around for many centuries. The djembe is a complex instrument that not only expresses its history, but also expresses a specific style of music that is not possible with European instruments. Demonstration of techniques and musical examples will accompany this look into a highly specialized world of percussion music.

Kayla Kolis
Faculty Sponsor: Lawrence Zettler
A modified technique for micro-sampling Mammuthus tooth enamel for stable isotope analysis

Recent work on the timing of proboscidean tooth enamel formation has led to advances in the use of stable isotopes to understand the diet and behavior of these taxa. Although these techniques continue to yield excellent insights into the diet and behavior of mastodons and mammoths, current sampling techniques typically require the removal of large sections of enamel ridge-plates. We have modified this technique to accommodate in situ micro-sampling of complete specimens. Precise movement and micro-sampling of the specimen are controlled by a Newmark NSC-G, 3-axis motion controller. Each specimen is sampled in multiple sets which each correspond to 1-cm of tooth growth. Each 1-cm set consists of ten samples and each sample consists of a series of vertical sub-samples. Each 100 µm deep sub sample is individually collected and processed through the entire thickness of the enamel. All enamel powder is collected in de-ionized water to maximize sample recovery, and lubricate the bit. The sample nearest the enamel-dentin junction is analyzed for δ13C, δ18O or δ87Sr/δ86Sr signatures. Although this technique is both time- and labor-intensive, it is minimally invasive and is capable of sampling enamel growth structures at a high resolution.
Kissing bugs are known vectors of *Trypanosoma cruzi* - the protozoan that causes American trypanosomiasis or Chagas’ disease. We sampled 20 families in San Luis for their familiarity with these insects. All of the families reported seeing the bugs, and 19 families allowed their properties to be searched. Three specimens were obtained from one property, and two additional bugs were collected on the University of Georgia – Costa Rica campus. To determine if these bugs harbored *T. cruzi*, the lower portions of the insects’ abdomens were manually compressed but to no avail, indicating the insects had not fed enough prior to sampling. We then provided the bugs with fresh beef liver, which served as a blood meal, and after 24 hours, frass samples were obtained from the engorged insects. The samples were placed directly on microscope slides – one sample in saline solution and a second in ethanol solution for staining. Upon viewing the samples in saline with microscopy, numerous swift-moving, serpentine organisms were prevalent in three of the insects. These organisms matched published descriptions for *T. cruzi*, suggesting that these insects could potentially serve as vectors of Chagas’ disease in the Monteverde region of Costa Rica.

Elizabeth Manary
Faculty Sponsor: Jeremy Alm
Embedding the Lattice $M_\ell$ as a 0-1 Sublattice in Subgroup Lattices of Direct Powers of $\mathbb{Z}_n$

Let $M_\ell$ denote the lattice with top element, bottom element, and $\ell$ pairwise-incomparable atoms. If $M_\ell$ appears as a 0-1 sublattice in Sub($G$) for a finite abelian group $G$, then the top element of $M_\ell$ is $G$, the bottom element is $\{e\}$, and the atoms $H_1, \ldots, H_\ell$ are subgroups satisfying $H_i \cap H_j = \{e\}$ and $H_i H_j = G$ for all $i \neq j$.

For $G = \mathbb{Z}_n^N$, we have the following:

1. If $N$ is odd, then the maximum $\ell$ is 2;
2. if $N = 2$, the maximum $\ell$ is $p + 1$, where $p$ is the smallest prime dividing $n$; and
3. we conjecture that for $N = 2k$, the maximum $\ell$ is $p^k + 1$, where $p$ is the smallest prime dividing $n$.

Elizabeth Manary
Faculty Sponsor: Mary Marshall
The Erdos Distance Problem
Abstract

Let $P$ be a set containing $n$ elements in $\mathbb{R}^d$. Then define
$$\Delta(P) := \{|p-p'| : p, p' \in P\},$$
where
$$|x| := \sqrt{x_1^2 + \ldots + x_d^2},$$
the standard Euclidean distance.
In the Erdős distance problem we want to know the smallest possible size of $\Delta(P)$ over all sets $P$ of a given fixed size. In other words, what is the minimum number of distinct distances determined by a finite number of points? Erdős conjectured that if we let $P$ be a subset of $\mathbb{R}^d$, $d \geq 2$, such that $\# P = n$. Then
$$\# \Delta(P) \gtrsim n^2$$
if $d = 2$, and
$$\# \Delta(P) \gtrsim n^{\frac{d}{2}}$$
if $d \geq 3$.
Wishing about the problem on the plane is less abstract, and so much has been shown for the case where $d = 2$. In the cases where there are a small number of points in the plane, one can easily derive the minimum number of distinct distances possible. Erdős showed in 1946, if $d = 2$ and $\# P - n$, $\# \Delta(P) \gtrsim n^{\frac{5}{3}}$.

Kelly McCormick  
Faculty Sponsor: Devin Bryson  
Feminist Ideas in the Works of Marguerite Duras  
The famous French writer, Marguerite Duras, published novels and film scripts for the majority of the second half of the 20th century, from 1943 until her death in 1996. Much debate has centered on her role as a woman writer and her works as feminists texts. In this paper, I argue that Marguerite Duras’ works acts as a bridge between First Wave literary feminism, such as Virginia Woolf’s *A Room of One’s Own*, and Second Wave literary feminism, such as Hélène Cixous and Luce Irigaray’s theory of l’écriture feminine. I analyze three of Duras’ novels—*L’Amant*, *Moderato Cantabile*, and *Le Ravissement de Lol V. Stein*—as well as the screenplay for her film—*Hiroshima Mon Amour*. I analyze how Duras uses narration and point of view, violence, and other literary techniques in her works to explain the oppressive situation of women.

Kelly McCormick  
Faculty Sponsor: Jim Kerbaugh  
Renaissance Humanism in Robert Browning’s Painter Poems  
Victorian poet Robert Browning wrote historically minded poems about Renaissance Italy. His dramatic monologues which chronicle the lives of famous painters from the Renaissance are possibly his most famous works. In this paper, I argue that in the poems “My Last Duchess,” “The Bishop Orders His Tomb at St. Praxed’s Church,” “Andrea del Sarto,” and “Fra Lippo Lippi,” Browning expresses the zeitgeist of the Italian Renaissance and exhibits the shift of its art from religious to a more secular and humanist. I take a multi-disciplinary approach to understanding the historical aspects in Browning’s poems. I use historical information about the Renaissance, critiques of Renaissance paintings, art history, literary analysis of Browning’s poems, and biographical information about Robert Browning himself to
understand that art, literature, and history have a common thread. Literature can use art to explain history in innovative ways that not only explain everyday human emotions, but also help people understand humanity’s progress.

Taylor Molandro
Faculty Sponsor: Nancy Taylor Porter
Senior Showcase

The senior showcase demonstrates knowledge and skills I have gained as an actor and singer in the theatre and music programs. I am performing a monologue, a song, and two scenes. The first piece is Emilia from Othello and the second is the song "Climbing Uphill" from The Last 5 Years. The first scene is "Sad and Glad" from John Cariani’s Almost, Maine, and the final selection is from Jon Tuttle’s Terminal Café. Additional students: Jordan Jamison, Tamar Norville, and Stephanie Pallay

Hannah Oak
Faculty Sponsor: Reiko Itoh
The Dilemma of Japan’s Declining Birthrate

During this presentation, I will give a brief overview of the population crisis in Japan and how it has come to reach this point after decades of birthrate decline across the nation. I will present several factors that have had significant impact on the decline and analyze how each factor has contributed to the diminishing population. The factors examined include: the evolution of gender roles, pursuit of higher education, and value beliefs adopted through Westernization. Data and information used in this research was collected through interviews with a group of Japanese women during my study abroad in Japan as well as scholarly books, Japanese newspapers, and magazine articles. Even though Japan is a very technologically advanced nation, gender stereotypes in Japan hold strong to their historic roots. The Japanese government in particular has a large role to play in both the problem and solution to the declining birthrate, as they have failed to recognize this social change sweeping across the country.
I will conclude my presentation with projections for the future birthrate and give prescriptions for what Japan should be doing in order to solve the issue for this population crisis.

Hannah Oak
Faculty Sponsor: Steven Gardner
How the European Economic Crisis is Shaping Spanish Society

The current economic crisis in Europe is affecting more than just bank accounts of European citizens. It is shaping culture and changing the attitudes of citizens across the EuroZone. In this project, I analyze how this paradigm can be seen in Spain especially, where the economic crisis is having negative consequences such as record high unemployment and significant cuts to education. These consequences then have a ripple effect on social behavior, emigration, family dynamics and more. As the economic crisis in Spain has continued, I have tracked and recorded the attitudes of a group of young Spaniards, some of whom have now migrated to other countries in search of employment opportunities. Through the testimonials of Spanish youth, I give the crisis a face, exposing it as more than a slew of statistics. In addition to personal experience and conducting interviews while abroad, I have also analyzed countless newspaper articles, books, and other written texts to gain a well-rounded understanding of the sectors most affected by the crisis and how the younger generation in Spain is directly affected as they are faced with the challenge of moving the nation forward.
Alexis Palumbo  
**Faculty Sponsor: Lawrence Zettler**  
A survey of households in the San Luis Valley of Costa Rica for the use of natural medicines derived from plants

Physicians, pharmacies, and antibiotics are the way in which many inhabitants of the United States and developed countries receive medical attention. In third world or developing countries, Western medicine is present but we hear of many herbal remedies, or natural medicine, being used to treat ailments. To further develop knowledge of natural medicine, we set out to interview families in San Luis and Santa Elena (near Monteverde) in Costa Rica, on their preference of pharmacies or natural medicine. Participants were also asked about the uses of each plant. We interviewed 22 separate households in this region. Of the 22 families, only two said they do not use natural medicine and one family preferred pharmacies but still used natural medicine. When interviewed, 19 different plants were named to have been used for ailments such as stomach aches to kidney infections. The top five plants included a mint species (72.7%), Aloe (59.1%), Lemon Verbena (50%), Rosemary (45.4%) and Chamomile (22.7%). Interestingly, all five of these plants are exotic species (i.e., not native to Costa Rica). Considering that this Central American country is well known for its unusually high biological diversity, it was surprising that none of the favored plants used by those in the local community were native species.

Kavita Patel  
**KAVITA K. PATEL1, ERNESTO MUJICA2, LAWRENCE W. ZETTLER1. Orchid Recovery Program, Illinois College, USA1, ECVIDA, Pinar del Rio, Cuba2.**

**Faculty Sponsor: Lawrence Zettler**  
The Ghost Orchid, *Dendrophyllax lindenii*, in South Florida and Cuba: A Mysterious Tale of Two Very Different Habitats Catering to One Orchid Species.

Few orchids native to North America have received as much attention as the Ghost Orchid, *Dendrophyllax lindenii* – the subject of best-selling books and a hit movie. The species is restricted to Cuba and the Big Cypress Basin eco-region of south Florida where it is found attached to host trees as a leafless epiphyte. In Florida, the species has suffered from habitat loss and poaching for its alluring floral display coupled with its favorable (sweet) scent. Although most people are familiar with *D. lindenii* inhabiting south Florida, few have ventured to Cuba to study populations in that country and to study how they are similar or dissimilar to those in the U.S. This talk will present a general overview of Cuban ghost orchid populations compared to those in the Big Cypress Basin eco-region after visits were carried out during the summer of 2013 to Florida, and in January of 2014 to the Guanahacabibes National Park, Cuba. One striking difference between the two areas was the lack of standing water in the Cuban population and differences in host tree species. Orchids in both regions, however, were sheltered from wind (except for periodic hurricanes) and appeared to have continuous access to high relative humidity.

Chandler Polyte  
**Faculty Sponsors: T.J. Devine and Kevin Klein**  
What is the Size of Your House? Where is It Located?

This project is a real estate analysis of the housing market of Jacksonville IL, a market that is broken down into five segments, most commonly known as the five council wards. To construct the research, data about houses sold in the Jacksonville area was collected and refined to create a sample of statistics. In using statistical tools, the data becomes meaningful by making it possible to measure the value of a house based on its location [ward] and other factors. The end result of the project establishes grounds to evaluate or differentiate the prices of houses based upon their wards.
Samuel Porter
SAMUEL E. PORTER1, ELLEN RADCLIFFE1, ANDREW L. STICE, LARRY W. RICHARDSON2, LAWRENCE W. ZETTLER1. Orchid Recovery Program, Illinois College, USA1, Florida Panther National Wildlife Refuge, U.S. Fish & Wildlife Service, Naples, FL USA2

Faculty Sponsor: Lawrence Zettler


North America, excluding Mexico, harbors ca. 210 native orchid species, few of which have been propagated from seed given their fastidious germination requirements involving mycorrhizal fungi. Several members of the genus *Spiranthes*, however, have been successfully propagated from seed leading to reintegration by means of symbiotic seed germination, i.e., inoculating seeds with fungi in vitro. The focus of this study was to propagate the grass-leaved ladies’ tresses, *Spiranthes vernalis*, and to identify the mycorrhizal fungi that this terrestrial orchid may utilize in situ to fulfill its early seed germination needs. In the Florida Panther National Wildlife Refuge in Collier Co. a large (>300) population of *S. vernalis* was observed in flower in a secluded open field in mid-March of 2013. Roots were collected for fungal isolations, and seeds were obtained from mature capsules collected during a return trip two weeks later. Root pelotons yielded four strains of mycorrhizal fungi assignable to ubiquitous anamorphic genera *Ceratorhiza* and *Epulorhiza*, all of which were deposited into the University of Alberta Micofungus Collection and Herbarium in Canada (UAMH) for safekeeping. Seeds inoculated with the *Epulorhiza* strain (UAMH 11737) in vitro germinated rapidly and developed to leaf-bearing stages after 84 days, whereas seeds inoculated in the absence of fungi (control) and with one *Ceratorhiza* strain (UAMH 11740) failed to yield seedlings. Considering that orchids are highly vulnerable to environmental changes, such information may be useful for conservation projects.

Morgan Rush
Faculty Sponsor: Jenny Barker-Devine
Making Histories: Genealogical Research at the Governor Joseph Duncan Mansion

The Governor Joseph Duncan Mansion in Jacksonville is filled with many fascinating histories and records about the early days of Morgan County that, until recently, had never been discovered. Studying Jacksonville’s early years, from pioneering residents to the founding businesses in town, allows for a rare view of genealogy in action. The purpose of this presentation is to use genealogical and local history research originally found in the records at the Duncan Mansion to demonstrate the connections between 19th and 21st century Morgan County.

Andrew Salyer
Faculty Sponsor: Tim Kramer

Musical Revival in England: Part of a Bigger Picture

“Revival” is a term regularly applied to many different musical genres. England has a strong tradition of musical revival, one which goes back perhaps further than other European countries. This presentation reviews three specific revivals in order to show that musical revivalism in England is part of a larger cultural picture, one which values and preserves its heritage, is steeped in, and glorifies, “the old.” The Concert of Ancient Music, an orchestra founded in 1776, was dedicated to performing works more than twenty years old and was the first to establish a musical canon. The Choral Revival of the mid-nineteenth century sought to imbue the apathetic Anglican Church with new life by raising the standards of church music and looking to the Tudors as the golden age of choral music. The international Early Music Revival of the mid-twentieth century in England sought to bring scholarship and performance to composers of the English Baroque and Classical eras, figures who are best remembered for being forgotten. The success
and popularity of each movement is rooted in the English preoccupation with their own heritage and the sense of national pride that came with rekindling the past.

**Aaron Schneider and Nicholas Hommowun**  
**Faculty Sponsor: Jeremy Alm**  
Mixed, Multicolor, and Bipartite Ramsey Numbers Involving Trees of Small Diameter

In this paper we study Ramsey numbers for trees of diameter 3 (bi-stars) vs., trees of diameter 2 (stars), complete graphs, and many complete graphs. In the case of bistars vs. many complete graphs, we determine this number exactly as a function of the Ramsey number for the complete graphs. We also determine the order of growth of the bipartite k-color Ramsey number for a bistar.

**Senior Seminar in Communications**  
**Faculty Sponsor: Kallia Wright**  
Twerking, Snapchat, Intimate Pursuits, Small Businesses and Facebook: Examining Diverse Approaches in Communication

Facebook, smartphones, the bar and the dance floor provide opportunities for communicating salient messages about businesses and individuals. Through this panel, communication majors present four research papers that emerged from the Senior Seminar in Communication (CO 415) course. Students conducted research guided by qualitative research methodology in the first eight weeks of the semester to fulfill the requirements of the course. Their research explores the impressions communicated when we engage in pop culture behavior and use computer-mediated communication to enhance business relations.

**Kathryn Stroud**  
**Faculty Sponsor: Steven Gardner**  
Current Discourse on Gender and Homosexuality in Ecuador

Clinics have arisen in Ecuador where individuals are admitted to be “dehomosexualized.” These clinics not only operate to eradicate homosexuality, but they also act as agents operating against female sexuality. The victims of these centers are predominately women. Lesbians exist as deviants within the society and threaten the Ecuadorian gender norms. In the past fifteen years, both the feminist and LGBTQ movements have gained much traction and have begun to call into question the male authority within the society. In response to the achievements of these movements, conservative groups have retaliated in unique ways. Although abuse towards homosexuals has been ongoing throughout history, Ecuador is a special case because of the myriad of torturous practices used at the centers, including rape, starvation, beatings, and electro-shock therapy. During the summer of 2013, I studied abroad in Cuenca, Ecuador and interned at a women’s crisis center and feminist activist organization. While there, I read contemporary newspaper articles and human rights reports and analyzed the historical trends over the past decade. I will conclude with steps necessary for the eradication of these clinics.

**Katia Swane-Barzowski**  
**Faculty Sponsor: Jeff Garland**  
H: The Art of Self-Starvation

Self-starvation has been studied by dietitians, psychologists, doctors, writers, anthropologists etc. since the 19th century, though it has arguably existed since medieval times. This performance explores the practice of self-starvation from three different perspectives: the hospital, the gallery, and the prison. Each perspective focuses on a different objective of self-starvation. These objectives are body image, performance art, and political resistance, respectively. The presentation combines the disciplines of creative writing, theatre/drama, and art to create an interactive experience in which the audience
"lives" self-starvation through the performer as she paints herself away. This is an aurally, visually, and emotionally stimulating performance that draws attention to the practice of self-starvation and challenges traditional stereotypes about anorexia nervosa, revealing the process of objectification and how it simultaneously influences and is inspired/inflicted by society.

**TheatreWorks**  
**Faculty Sponsor: Nancy Taylor Porter**  
Exhibitions of Elizabethan Monologues, Scenes with Stage Combat, and a Light and Sound Creative Project

Advanced Acting (TH 353) prepares students mentally, physically, and vocally to perform work from earlier historical periods of theatre history. Students will explain what techniques they used to analyze and rehearse their pieces, including, where applicable, their rationale for choices of staging and "violence design." Four students will present their Elizabethan/Restoration monologues from *King John*, *Henry VI*, *Othello*, and *The Rover*. Three pairs of students will present scenes involving combat from *Hamlet*, *Henry VI*, and *King Lear*. Finally, Light and Sound (TH 363) has been training students in these areas of technical design, and one student will be discussing and presenting a creative project from this course. Zipporea Abdulamik, Nonnie Falk, Kage Garza-Smith, John Love, Tamar Norville, Oyinda Oshiafi, Stephanie Pallay, Drew Stroud, Kenshunna Tolliver, Wilson Webel

**Hana Thixton and Audrey Knight**  
HANA L. THIXTON¹, AUDREY C. KNIGHT¹, JONATHAN P. KENDON², ANDREW L. STICE¹, KAZUTOMO YOKOYA², LAWRENCE W. ZETTLER¹, LAURA L. COREY¹, VISWAMBHARAN SARASAN². Orchid Recovery Program, Illinois College, USA¹, Royal Botanic Gardens, Kew, United Kingdom².  
**Faculty Sponsor: Lawrence Zettler**  
Conservation of critically endangered orchids from the Central Highlands of Madagascar: an update.

In 2012, a collaborative 5-year research project was initiated between Illinois College and the Royal Botanic Gardens, Kew aimed at conserving critically endangered orchids from the Central Highlands of Madagascar. More than 100 taxa were targeted, ranging from epiphytes, terrestrials, and lithophytes collected from seven different regions and habitats. During April and May (2013), shortly after the rainy season, orchid-rich substrates were closely inspected for seedlings and root pieces were detached, placed into vials, and promptly returned to labs at Kew and Illinois for fungal isolations. Root pieces from mature orchids were also obtained for this purpose. Mature and unripe capsules were collected for long-term experiments, namely involving symbiotic and asymbiotic seed germination, respectively. Our combined efforts yielded several strains of orchid mycorrhizal fungi tentatively assignable to ubiquitous basidiomycete genera *Ceratobasidium* and *Tulasnella* from terrestrials, epiphytes, and lithophytes alike. Of particular interest was the prevalence of pelotons in seedlings of epiphytic species, lending support to the hypothesis that tree-dwelling orchids continue to utilize mycotrophy after initiating leaves. Efforts are underway to verify the identification of these isolates using ITS sequencing. To our knowledge, this is the first report that documents orchid mycorrhizal fungi from Madagascar.

**Taylor Thomas**  
**Faculty Sponsor: Jenny Barker-Devine**  
Bridging the Gap: Native and African-American Relationships and Its Effect on 21⁰-Century Race Debates

When Americans think about slavery, the first thing that usually comes to mind is when white slaveholders in the South held African Americans as slaves. But few people know about how another group of individuals, Native Americans, were slaveholders of African Americans as well. These
interactions between the two groups began to flourish, resulting sometimes into interracial relationships. These marriages resulted in unique children of a mixed race, where both races shared the common experience of oppression. Through my research, I discovered how these children were viewed by the Cherokee Nation, and what hardships that these mixed couples faced at a time when interracial relationships were frowned upon. I used my research to open up how slavery of African Americans by the Cherokee affected how the children classified themselves as a member of the Cherokee Nation and how this had an impact on 21st-century race debates.

Amibeth Thompson  
Faculty Sponsor: Bernd Estabrook  
Energy in Germany

Today, Germany is known as the world leader in renewable energy. Germany mandated the “Energiekonzept” after the Kyoto Protocol, an international agreement in 1997 that aims to reduce greenhouse gas emissions 80% by 2050. The most economically viable types of renewable energy come in the form of wind power, photovoltaic solar power, hydroelectricity, biofuel, and geothermal power. An energy policy employs a concept called “feed-in tariffs,” used to motivate homeowners to participate in the conversion to renewable energy. Has Germany benefited economically from the Green Laws mandating and requiring change in all areas of the country? Have the results been beneficial to the country? Germany has claimed that it has drastically reduced greenhouse gas emissions and increased the usage of renewable resources. However, the policies have caused energy prices to skyrocket, making the market no longer economically profitable. The United States wants to follow Germany’s lead, but in looking at the data, are these policies economically viable?
POSTERS

Anne Aiello, Jacob Franke, Justin Gray, Kyle Mason, and Elias Trace
Faculty Sponsor: Zvi Pasman
Preparation of a Quantitative PCR Standard for a Nitrogen Cycle Bacterial Gene

Environmental microbiologists currently employ molecular methods to identify soil microbes, as well as the activities of expressed soil microbial genes. One such method is the quantitative Polymerase Chain Reaction (qPCR), which can provide information about the copy number of specific genes, as well as the extent of specific gene expression. The method works by comparing the real-time PCR amplification profiles of a specific gene (whose amount is unknown) to the amplification profiles of several standards of the same gene. Often, qPCR standards are difficult to obtain because they are extracted from microbes that require unusual growth conditions. Here, we prepared a convenient qPCR standard for \( nifH \), a bacterial gene encoding a protein involved in the nitrogen fixing reaction, \( N_2 \rightarrow NH_4^+ \). We sub-cloned a fragment of \( nifH \) DNA into a plasmid that is easily propagated in \( Escherichia coli \). We confirmed the insert by restriction digests, PCR amplification reactions, and DNA sequencing. This general strategy of producing convenient qPCR standards can be applied to any gene of interest.

Claire Barclay
Faculty Sponsor: Reiko Itoh
Japanese Flying Foxes

Bats of the order, \( Pteropus \), commonly known as Flying Foxes because of their pointy noses, are the largest bats in the world. The Flying Foxes of Japan are unique as these bats are found only in the southern islands of Japan. There are three species in Japan, but due to some of their behaviors, they are endangered. Because flying foxes are frugivores and are attracted to fruit from trees on farms, farmers want to exterminate them to protect their crops. Also, flying Foxes are nocturnal and make great pets, especially for single workers living in city apartments, so they are taken from the wild. In addition, Flying Foxes have been part of the local diet on some of the islands. To save these species from extinction, scientists need to work with islanders on conservation education and in supporting the local fruit industry. Reasons for saving these creatures from extinction and their role in the Japanese ecosystem will be discussed.

Crystal Beckman
Faculty Sponsor: Mioko Webster
Social Acceptance of Gays in the United States and Japan

Both the United States and Japan need to work toward creating equality for gays in their respective countries. In America, there are some policies in place to protect the rights of homosexuals, but gays are not fully accepted by certain groups of people. In Japan, there is minimal legal acceptance—in the form of anti-discrimination laws—but in general, people are far more willing to accept homosexuality. Cultural ideals, such as religion, history, and media, also contribute to the amount of social acceptance homosexuals receive. While a solution for the lack of social acceptance is needed, problems like stereotypes, lack of education, and Japan’s collectivist society stand in the way. However, the United States and Japan can make improvements to become more socially accepting. These changes include creating better education on the subject and becoming more open to differences in other people. Studying and comparing the differences in both nations can create understanding and help solve the equality issues for gay people in each country.
Spencer Campbell  
**Faculty Sponsor: Kevin Klein**  
Farming – A Business of Profits

With continuously improving farming technology, land, crop insurance policies, and government support, farming has become a lucrative business. In recent times, farming technology has made uncanny improvements that have created a more profitable and efficient process for farmers. Land values continue to rise insuring land-owning farmers access to future income. Crop insurance companies have created new policies that offer policy holders guaranteed benefits. Continued government support for farmers through farming subsidies also creates a strong contingency plan for the farming industry. With ever-changing technology and continuously increasing land value, farming will continue to rise in profitability. Extensive research and analysis of farm technology, land values, crop insurance policies, and farming subsidies will show each of these factors provide means for farmers to guarantee future profits, proving farming is an industry that will continue to thrive through the future.

Marissa DeLong  
**Faculty Sponsor: Reiko Itoh**  
Comparison of the Ongoing Situation Regarding Invasive Fish in Lake Biwa Japan and the Illinois River

In the fall of 2013, a group of Life Science students at Ritsumeikan University in Japan and students in Contemporary Japanese Society course at Illinois College worked on collaborative research on invasive fish in Lake Biwa (Shiga Prefecture, Japan) and Illinois River (Illinois, USA). Ritsumeikan University’s College of Life Sciences in located near Lake Biwa, which has been suffering from the invasion of bluegills and bass, which are native to the US. Illinois College is located near Illinois River and has been suffering from the invasion of Asian carp, which are native to Asia. With the cooperation between students from Ritsumeikan University in Japan and Illinois College in the United States, we have discovered that the invasive species were introduced in a similar way and have almost destroyed the native ecosystem in both sites. The role of cultural traditions in efforts to contain these invasive species will be discussed.

Meagan Donahue  
**Faculty Sponsor: Patricia Kiihne**  
Continued Fractions

Leonhard Euler’s paper *De fractionibus continuis dissertatio* (An Essay on Continued Fractions) provided a foundation for mathematical work in continued fractions. In this talk, I examine contributions from this paper, including definitions and examples of continued fractions. Moreover, I will look at some ways continued fractions are used in chaos theory.

Paige Graham  
**Faculty Sponsor: Jeremy Turner**  
Effect of African American Experimenter on Implicit Racist Behaviors

College students are faced with diversity on a daily basis, including variations in skin tones. Avi Ben-Zeev (2014) argues that skin tone has emerged as the most allegedly diagnostic feature in racial judgments. As a result of his experiment, he argues that a black male who is associated with the word "educated" tends to be remembered as "whiter" in accordance with cultural beliefs. The present experiment investigates the influence of an African American versus white experimenter on an implicit test of racism. It was hypothesized that the presence of an African American experimenter would result in lower implicit racism scores. Implicit racism levels of the participants were measured by the Harvard Implicit Association Test on Race (Black-White IAT). The data was statistically analyzed to determine
whether the presence of an African American experimenter lowers implicit racism scores. Results and implications of this study will be discussed.

Adam Hamerlinck  
Faculty Sponsor: Kevin Klein  
Economics of War in Africa

Africa has found itself being torn apart by war for generations. These wars have been everything from international turmoil to politically influenced civil wars. These wars have ranged from political threats to nationwide genocide. Thousands of Africans have lost their lives due to these devastating conflicts. Political power and social injustice are not the only factors of war. The economic state of these nations and the financial benefits involved paved a path towards war in these countries. I will discuss the economic conditions that often lead to war and how economic growth has fallen short of potential growth as a result of on-going conflicts.

Hillary Harrison  
Faculty Sponsor: Mary Marshall  
The Four Color Theorem

The Four Color Theorem was proposed by Francis Guthrie in 1852. He wanted to prove that an arbitrary map could be colored with only four colors given the requirement that countries who share a border have different colors. Many mathematicians have studied this conjecture and come up with a few ideas on how to solve this problem. Some of the later processes included the use of computers which is seen as very controversial by some professionals of this field. Finally, in 1976, Kenneth Appel and Wolfgang Haken finalized a solution to the proposition, and a proof was written. In my presentation, I will tell the history behind the Four Color Theorem, explain some of the techniques used in the proof, and show the progression of ideas from these various mathematicians.

Amy King  
Faculty Sponsor: Jeremy Turner  
Relativity of Sight and Sound on the Judgment of Musical Performance

Chia-Jung Tsay (2012) found that people have a higher chance of selecting the winner of a prejudged musical competition if they only see a visual performance of each competitor in the musical competition, rather than just listening to the sound of the performance or listening to the sound and seeing the visual. 48 participants viewed four 2 minute clips from a prejudged musical performance, but the participants were randomly placed into 3 separate groups. One group viewed only the visual performance, the next group listened to just the sound of the performance, and the last group listened to and watched the performance. At the end of the videos each group ranked the competitors in order of who they thought won to who they believe lost. The relative importance of sight and sound on judgment of musical performance will be discussed.

Blake Maddox  
Faculty Sponsor: Mioko Webster  
Hikikomori Syndrome: The Lost People

The Hikikomori syndrome was recently discovered in Japan and it is increasing among the millennial generation, mostly in males. The sufferers seclude themselves in their homes or rooms to avoid interaction with society and people. Because of their condition, they depend on their caregivers for daily tasks such as getting meals and cleaning. This trend in the young generation will affect the Japanese economy and population in future. Due to their secluded lives, the so-called “parasite singles” will stay
unemployed and unmarried into their 30’s and 40’s or even older depending on their parents. From the research I have done, I will propose some methods to help curb this syndrome.

Riley Marshall  
**Faculty Sponsor: Elizabeth Rellinger Zettler**  
The Role of Repeated Practice in Letter Learning in a Child with Learning Disabilities

The ability to recognize letters is a significant predictor of later reading ability and academic success in children. However, letter recognition is particularly challenging for children with certain learning disabilities. The goal of this study was to examine these difficulties in a specific child with an unspecified learning disability, as well as to investigate the effects of special education and other services on this specific child's abilities. It was a single-subject quasi-experiment in which the letter recognition of this four year-old child was tested on a weekly basis to look for patterns in the number of letters recognized correctly from week to week as well as patterns in the specific letters that were recognized. The current data reveal several learning difficulties in this child, including problems with long-term retention of information and a deficit in her ability to reconcile new information with old information. It is suggested that, while the services that this child receives have assisted her in acquiring new information, it has not helped her to combine this information with what she has learned previously. This case will be discussed in terms of the importance of early and accurate diagnosis for proper intervention among pre-school children.

Ana Medina, Matt Nelson, and Chandler Polyte  
**Faculty Sponsor: T.J. Devine**  
Unemployment Rate Inaccurate Due to Illegal Immigration

Unemployment estimates are treated like precise numbers when in reality they are simply estimates from a sample. This project examines the flaws in the calculation of the unemployment rate and estimate confidence intervals around these point estimates. Taking data from the Bureau of Labor Statistics over the last 10 years, we will report if month-to-month changes in the unemployment rate are significantly different from zero. In addition, inaccuracies in the unemployment rate in the U.S. are revealed. This highlights the deficiencies in unemployment indicators and questions the reliability of this data.

Hannah Moore  
**Faculty Sponsor: Elizabeth Rellinger Zettler**  
Effects of Divorce on College-Aged Children: The Mediating Role of Conflict in the Home

Many researchers have documented the negative effects of divorce including high levels of depression, anxiety, low self-esteem, adolescent delinquent behavior, and lower academic performance. However, new researchers have begun to look more complexly at this issue to focus on the role that changing levels of conflict within the home have in moderating these effects. In the current study, students from various family compositions were asked to retrospectively report on the level of conflict in their homes. Students whose parents were divorced were asked to report on levels of conflict both before and after the divorce. All students also completed the College Adjustment Scales (CAS). The CAS includes nine scales: Anxiety, Depression, Suicidal Ideation, Substance Abuse, Self-Esteem Problems, Interpersonal Problems, Family Problems, Academic Problems, and Career Problems. It was hypothesized that, overall, there would be a negative correlation between level of conflict and scores on the CAS subscales. In the case of students whose parents are divorced, it was predicted that those students whose home conflict level decreased after divorce would have significantly better CAS scores than would students whose home conflict level increased after the divorce. Implications for research will be discussed.
Nick Moscardelli  
**Faculty Sponsor: Brent Chandler**  
Ongoing Work Towards a Preparation of Muscone

Muscone is a pleasant smelling pheromone that is used in traditional Chinese medicine and certain perfumes. The musk deer that produce this pheromone have been hunted to near extinction and are now listed as an endangered species. The goal of the muscone project is to provide an environmentally kind and cost efficient synthesis of muscone in order to save the musk deer. This poster will outline our ongoing work to identify reaction conditions that will improve the synthesis by balancing two important factors: environmental impact and overall yield.

Phuong Nguyen  
**Faculty Sponsor: Kevin Klein**  
Income Distribution and Its Impact on Economic Growth in Vietnam

The current debate on minimum wage in the United States is rooted in the question of the relationship between income disparity and macroeconomic growth of a nation. Capitalistic principles typically caution against equal income distribution. But in the case of Socialist Republic of Vietnam, where equality is the principle and poverty eradication is still a priority, economic policies that promote income equality are considered differently. The paper examines the background of the issue by closely looking at the history of income distribution in Vietnam; reviewing previous research on income inequality and growth, studying examples from other countries, and providing policy recommendations based on these findings.

Josephine Oshiafi  
**Faculty Sponsor: Kevin Klein**  
Transition of the African Economy Centuries after Colonization

Empirical research by development economists has yet to prove that there is a direct statistical correlation between colonialism in Africa and subsequent economic growth; however, political scientists have discovered that colonial policies did, in fact, affect current economic policies and political systems in Africa. This study examines the economic policies and political system of Indirect Rule, which the British Empire imposed on their African colonies, and draws parallels to existing political and economic structures found on the continent. Nigeria, Tanzania, and Ghana are used as case studies. Critical analysis of the political systems and government policies over the years, using macroeconomic and international trade concepts, corroborates the link that researchers find between colonial history and Africa’s delayed growth. Particular attention is paid to the role of natural resource exports as a source of the recent rapid economic growth in Africa. It is concluded that colonization left deeply rooted economic and political structures that mirror those of developed countries, but they are not well-suited to the African locale. Current economic growth will be short-lived if countries continue to rely on one or a few lucrative natural resources, a legacy of colonialism. Diversified exports and technology adapted to Africa’s comparative advantage would go further in sustaining economic growth.

Alexis Palumbo  
**Faculty Sponsor: Lawrence Zettler**  
A Comparison of Medical and Behavioral Care Indices in Adults with and Without Pica Residing at a State Operated Intermediate Care Facility for Individuals with Intellectual Disabilities

Pica constitutes a prevalent problem with significant health risks, especially for adult s with intellectual and developmental disabilities. Because Pica is also associated with Kluver-Bucy syndrome, mineral deficiencies, autistic spectrum disorders, and other neuropathological disorders, a survey on attributes in the intellectually disabled adult populations with and without Pica was conducted via a retrospective chart
review. Information was collected using data from 2010 to 2012, twenty-six residents of Jacksonville Developmental Center had a diagnosis of Pica. An additional 26 residents were randomly selected from the JDC population for the purpose of comparison and their chart were also reviewed. Of the 26 residents diagnosed with Pica, 8 (30.8%) were diagnosed with Autism Spectrum Disorder and 22 (84.6%) had severe to profound intellectual disabilities. As predicted, autistic features (social reciprocity deficits, obsessive and repetitive behavior, and expressive and receptive language anomalies) were found. The link between oral exploratory behavior and Pica and autism suggests an association with other neuropathology found in Pica.

**Preston Rieck, Amber Riley, and Bianca Savarese**  
*Faculty Sponsor: Brent Chandler*  
**Ongoing Work to Prepare the Anti-infective Agent Orchinol**

Orchids, plants renowned and well-studied at Illinois College, naturally produce an antifungal agent known as orchinol. Due to the limited supply of drugs that treat fungal infections in humans, and in conjunction with the growing concern of resistance to currently available drugs, the antifungal properties of orchinol make it a compound of interest. We will present our ongoing work to develop a three step synthetic preparation of both orchinol and structural relatives of orchinol.

**Shafer Soars**  
*Faculty Sponsor: Brent Chandler*  
**Ongoing Work to Prepare the Anti-Cancer Agent Xenitorin A**

Xenitorin A is a compound that selectively kills lung cancer cells. Unfortunately, its only known source provides the material in very limited quantity in a non-renewable manner. As such, a successful *de novo* synthesis of the compound will address a significant and currently unmet need that would allow for thorough studies of its biological activity. This poster will outline our ongoing work to prepare xenitorin A through a novel asymmetric Rauhut-Currier reaction.

**Jonathan Stallons**  
*Faculty Sponsor: Elizabeth Rellinger Zettler*  
**The Lies Students Tell: Discrepancies between Attitudes towards Lying and Lying Behavior**

Although lying is generally viewed negatively in Western society, it seems that Nietzsche was right in saying that “the lie is a condition of life.” In fact, research shows that people average two lies a day. One reason for this attitude-behavior discrepancy is that people tend to classify their own deceptive practices into sub-categories that escape the actual label of a lie (e.g., using social skills, engaging in ingratiation, telling white lies to protect others, and being creative). However, even when we go beyond forms of prosocial lying, and even though most people state that lying is repulsive, they nonetheless will lie when it is expedient. This pattern was assessed among Illinois College students who were first asked to define lying and to report their attitudes about lying. Subjects were then asked how often they lie. In the next sections of this on-line study (designed so that students could not go back to change earlier responses), subjects were asked about more specific lies that are common among college students. It was hypothesized that students would generally report engaging in a higher level of specific lies than they did when asked about lying in a more global fashion.
**Bret Thixton**  
**Faculty Sponsor: Kevin Klein**  
Economic Impacts of Political Decisions in South Korea

For many countries, economic policy can lead to a path of prosperity or despair. Export Led Growth or Export Oriented Industrialization is often used as an example of economic policy that leads to prosperity. South Korea is often touted as an example of successful growth utilizing Export Led Growth. In reality, the growth of South Korea was not due only to the policy of Export Led Growth, but one that revolved around the Developmental State model as well. With the Developmental State model, South Korea was able to selectively intervene in the market. These interventions propelled exports that were of the government’s choosing. This two-pronged approach led to the economic growth that South Korea enjoyed for decades. While Export Led Growth played a factor in the growth of the South Korean economy, the Developmental State model served as the bedrock for the success of Export Led Growth. Export Led Growth was not the sole factor for South Korea’s success, rather it was a combination of Export Led Growth and the Developmental State model.

**Aaron Traum**  
**Faculty Sponsor: Jeremy Turner**  
Communication about Religious Topics in Romantic Relationships

Research has shown that those in romantic relationships and those that are religious tend to be happier than those who are single and those who are not religious, respectively (Demir, 2010; Stavrova et al. 2013; Lun & Bond, 2013; Saharaian et al. 2013; McCurry et al. 2012). However, very little research has been devoted to whether or not communicating about religious topics in romantic relationships affects the happiness of the individuals in those romantic relationships. The current experiment was conducted to examine the causal relationship between communication about religious topics in romantic relationships and reported happiness. Participants were separated into control and experimental groups which discussed neutral topics or religious topics, respectively. Both participant groups completed a modified Oxford Happiness Inventory survey following the discussion periods. It was hypothesized that those talking about religious topics would report a higher level of happiness. This study helped shed light on if communication about religious topics affected happiness in romantic relationships on the Illinois College campus.