Welcome to Scholarship Sewanee, our campus-wide celebration of student scholarship and creative work. The mission statement of the Undergraduate Research Initiative is

“To enhance student engagement, critical thinking and problem solving through meaningful intellectual student-faculty interaction, every student and faculty member will have the opportunity to engage in collaborative research or creative work in a vibrant and encouraging environment supported by the University as a whole”

Scholarship Sewanee is a critical part of this mission. It provides an outlet for students to share their outstanding work with the larger academic community in an open and supportive environment. This day of celebration also serve as an opportunity for members of the wider community to recognize both the students and the faculty mentors for their commitment to the ideals of scholarship and learning, their desire to make both new knowledge and a positive impact. In many ways scholarly work is not complete until it is shared with others; hence, your decision to join in our celebration of this work completes it and makes the scholarly process whole. Thank you for coming and we hope you have an insightful and enjoyable experience.

Events such as this symposium are only possible through the contributions of numerous generous benefactors. The following people and groups are gratefully acknowledged for their continuing support of Scholarship Sewanee:

- Walter and Mayna Nance
- The Andrew W. Mellon Foundation
- The Undergraduate Research Advisory Committee
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- Erin Cassell
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- The Student Presenters
- All the Faculty Sponsors and Mentors
- You!

Thank you!
Schedule of Events

Thursday April 23, 2015

7:30 PM   “Three by Tennessee”
Three One-Act Plays by Tennessee Williams
Studio Theater at Tennessee Williams Center
(performances continue on April 24th and 25th)

Friday April 24, 2015

9:00 AM - 12:00 PM Oral Presentations (Panels B to F)
Spencer Hall and Gailor Hall

1:00 PM - 2:15 PM: McCrady Lecture
Blackman Auditorium

2:30 PM - 4:30 PM Oral Presentations (Panels G to L)
Spencer Hall and Gailor Hall
Tennessee Williams Center

2:30 PM - 4:40 PM: Poster Presentations
Harris Commons (Spencer Hall)

4:45 PM Awards Ceremony
Blackman Auditorium

7:30 PM ¡Concierto!  Musics from Latin America
Sewanee Symphony Orchestra
Guerry Auditorium

2015 McCrady Lecture

Dr. Jeffery Lovich
U.S. Geological Survey and
Northern Arizona University


Past McCrady Lecturers

2013 - Rebecca Burwell, Brown University
2014 - Professor Paul Bartrop, Florida Gulf Coast University
ORAL PRESENTATIONS

PANEL A: Theater Arts - Studio Theater
7:30 PM  Three by Tennessee
Tia Strickland, Elise Anderson, Megan Quick

PANEL B: Biology - Spencer 164
9:00 AM  The Role of Histone Deacetylases in Mammary Tumorigenesis
Angelica De Freitas
9:20 AM  The effect of a disease-associated ataxin-3 protein expressed in different tissue types on the organismal heat shock response in C. elegans
Hannah Fay, Nakeirah Christie, Sheana Algama
9:40 AM  Correlation of tafazzin (TAZ) gene expression with cardiolipin composition in the Eastern red spotted newt (Notophthalmus viridescens viridescens)
Walker Ueland, Nancy J. Berner
10:00 AM  Twelve years of repeated wild hog activity promotes population maintenance of an invasive clonal plant in a coastal dune ecosystem
Callie Oldfield

PANEL C: Politics - Spencer 251
9:00 AM  The Effects of Income Inequality on Political Participation: A Contextual Analysis
James Szewczyk
9:15 AM  The Politics of Global Health: An Analysis the Factors that Influence the Global Political Prioritization of Global Health Issues
Rachel Schuman
9:30 AM  Voluntary Associations and Social Capital Among the Homeless: A Study of the Political Implications of Client-Status
Kiela Crabtree
9:45 AM  Civil Religion: The Competing Political Voices in the Black Community
Paniz Rezaeerod
10:00 AM  Mums the Word: An Analysis of the Portrayal of HIV/AIDS in Mainstream and LGBTQ Media
Taylor Yost

PANEL D: Anthropology and Visual Arts - Spencer 262
9:00 AM  The Culture of Play: A Means of Future Worth in Henry County An Ethnographic Study
Erin Smolskis
9:20 AM  Home-space
Monique Stitts
9:40 AM  The Space Between Trees
Bea Troxel
10:00 AM  Exploring Human/Environment Relationship through Photography
Allison Horick
10:20 AM  Gustav Klimt’s Judith and the Head of Holofernes: A Symbolist Approach to the Femme Fatale
Elizabeth Cowgill
10:40 AM  Progression or Not: Gender Representation in Disney Princess Films
(Amanda) Michelle Howell
**PANEL E: Humanities and Arts - Spencer 271**

9:00 AM  **Peace without Reconciliation: Religious Identity, Structural Violence, and the Northern Ireland Conflict**  
Hannah Boschert

9:20 AM  **Franco’s Spain in Buero Vallejo**  
Ahmad El-Bobou

9:50 AM  **STAR Students Community Project: English as Second Language for Native-Spanish Speakers at Tracy City Elementary**  
Jinni Tran, Mary Perez, Alex Macias, Andrea Ortiz

10:10 AM  **Is Vogue Ballroom a “Sinking Ship”?**  
David Terrell

**PANEL F: English - Gailor 130**

11:00 AM  **“Tormented Transformations: The Realization of Actaeon in Shakespeare’s Twelfth Night”**  
Blair Johnson

11:15 AM  **“Desire, Deceit, and Manhood in Shakespeare’s Othello and Metamorphoses 9”**  
Robin Lee

11:30 AM  **Divine Detriment and Truncated Rite: An Inquiry into the Laments of Ovid’s Niobe and Shakespeare’s Lear**  
Ansley McDurmon

**PANEL G: English - Spencer 151**

2:30 PM  **Harmonious Contradictions in Gerard Manley Hopkins’ “I wake and feel the fell of dark, not day”**  
Anna Lane

2:50 PM  **Masculinity and Misogyny in Sir Gawain and the Green Knight**  
Colin Harper

3:10 PM  **Wonder Ye Then At the Fiery Hunt: Monasticism & Calling in Melville’s Moby-Dick**  
Kayla Deep

3:30 PM  **Omnipotence in The Roman de la Rose: An Exploration of the Medieval Courtly Love Tradition**  
Sara Kachelman

**PANEL H: Social Science - Spencer 262**

2:30 PM  **Brazil and India: Perceptions of Global Leadership in Energy Policy for Environmental Stewardship.**  
Jay McChesney

2:50 PM  **Is Developing a Strong NCAA Division I-A Football Program a Cost Effective Marketing Tool for US Colleges and Universities?**  
MaKayla Cardwell

3:10 PM  **The Study of Success at the US Box-Office in the Motion Picture Industry and Its Factors**  
Yue Liu

3:30 PM  **Thrive 2055 Natural Treasures Initiative Project**  
Seminar in Environmental Studies, Beatrice Troxel, Elise Harrigan, Mallory Grimm, Catherine Hargrove, Allie Horick, Nicki Hubbard, Jamie Sue Wilson, John Black, Sara McIntosh, Monique Stitits, Laura Murray, Pierce McGrady, Sara Best, Sarah Bailey
PANEL I: History - Spencer 251
2:30 PM The Evolution of Jihad in Constructing a 21st Century Umma
Roger Chase Hagans
2:50 PM Extending Citizenship: Narratives and Voices in Haitian National Identity
Sarah Flowers
3:10 PM Self-Definition and Citizenship Education: The Cumberland Center for Justice and Peace in Sewanee, Tennessee
David Prehn
3:30 PM Challenges and Changes to the Identity of American Catholic Nuns: Reproductive Rights, Gay Rights, and the AIDS Epidemic
Claire Forbes

PANEL J: Sciences - Spencer 164
2:30 PM APPALACHIAN STREAM SALAMANDER BEHAVIORS CHANGE FOLLOWING RIPARIAN DISTURBANCE
Margaret Bliss, Kristen K. Cecala
2:50 PM Water quality monitoring of Harrison Spring in Sewanee, Tennessee
Tia Strickland
3:10 PM Sewanee Interactive Campus Map
Sewanee Computing Society, Austin Arnold, Hunter Stocker, Ryan Regal, Nasko Apostolov

PANEL K: Dance
2:00 PM More Than Two: An Informal Showing of Dance Choreography
Ellie Clark, Zack Gardner, Arthur Ndoumbe, Hilary Smith, Fridien Nana Tchoukoua

PANEL L: Music Composition
3:00 PM Discovering Cultures Through Music
Dr. Sidney A. King

PANEL M: Music Performance
7:30 PM ¡Concierto! Musics from Latin America
César Leal

Poster Abstracts can be found starting at page 20
ABSTRACT A

Three by Tennessee
Tia Strickland, Elise Anderson, Megan Quick
Department of Theater Arts
Faculty Sponsor/Mentor: Peter Smith

Time: 7:30 PM / Location: Studio Theater

Student-directed and acted productions of three of Tennessee William’s one act plays—“Moony’s Kid Don’t Cry,” “The Pretty Trap,” and “Interior: Panic.” The plays will be presented April 23rd to 25th at the Tennessee Williams Center.

ABSTRACT B1

The Role of Histone Deacetylases in Mammary Tumorigenesis
Angelica De Freitas
Department of Biology
Faculty Sponsor/Mentor: Alyssa Summers

Time: 9:00 AM / Location: Spencer 164

Histone deacetylases (HDACs) are enzymes that epigenetically modify nucleosomes repressing the transcription of certain genes. HDACs can also modify nonhistone target proteins altering their function. Understanding the diverse functions of HDACs has lead to an in depth study of the relationship between HDACs and cancer. Since the increased deacetylation of histones leads to increased cell proliferation, angiogenesis and invasion, the use of HDAC inhibitors (HDACi) may be a new therapeutic strategy. HDACi promotes cell cycle arrest, apoptosis and cell differentiation, while preventing angiogenesis. Previous studies have shown a decrease in cell viability, proliferation, and motility with the use of HDACi. Recent investigations are directed towards elucidating the mechanism through which misregulation of HDACs promotes invasion. Currently, we are investigating the role of HDACi on nonhistone target Hsp90 and its subsequent effect on the Her2 signaling pathway in mammary tumorigenesis.

ABSTRACT B2

The effect of a disease-associated ataxin-3 protein expressed in different tissue types on the organismal heat shock response in C. elegans
Hannah Fay, Nakeirah Christie, Sheana Algama
Department of Biology
Faculty Sponsor/Mentor: Elise Kikis

Time: 9:20 AM / Location: Spencer 164

Polyglutamine (polyQ) expansions are associated with a number of neurodegenerative disorders. One of these disorders, Machado-Joseph Disease is caused by the expansion of a polyQ-encoding CAG repeat in the gene encoding the ataxin-3 protein. Using ataxin-3 with various polyQ tract lengths fused to YFP and expressed in C. elegans, we study protein aggregation and toxicity associated with polyQ expansions. Specifically, we are interested in whether the expression of ataxin-3 with an expanded polyQ tract affects the ability to launch a protective heat shock response. We expressed ataxin-3 with various polyQ lengths in body wall muscle cells or neurons and monitored the transcription of genes that are normally induced in response to an acute temperature stress. Our preliminary data suggest that while completely abolishing neuronal function blocks the organismal heat shock response, expression of ataxin-3 with 75 glutamines has little effect on either motility or the heat shock response.
Correlation of tafazzin (TAZ) gene expression with cardiolipin composition in the Eastern red spotted newt (Notophthalmus viridescens viridescens)
Walker Ueland, Nancy J. Berner
Department of Biology
Faculty Sponsor/Mentor: Nancy Berner

Time: 9:40 AM  / Location: Spencer 164

Adult Eastern red spotted newts remain active in winter. Our research shows that acclimation to winter conditions includes higher skeletal muscle cytochrome c oxidase (CCO) activity and modification of fatty acid content of cardiolipin (CL). CL plays a role in maintaining mitochondrial membrane shape and is thought to facilitate structural changes necessary for CCO activity. After biosynthesis, CL is modified by the phospholipid transacylase called tafazzin (TAZ gene). Our experiment was conducted to test the hypothesis that TAZ gene expression levels change with season, providing a possible mechanism for changes in CL fatty acid makeup and CCO activity during acclimation. Skeletal muscle and liver tissue were extracted from newts collected in winter and summer, and quantitative real time PCR was run. Data from liver tissue samples show a significant (p = 0.017) increase in TAZ expression in winter. We expect TAZ levels to be up-regulated in winter newt skeletal muscle tissue as well.

Twelve years of repeated wild hog activity promotes population maintenance of an invasive clonal plant in a coastal dune ecosystem
Callie Oldfield
Department of Biology
Faculty Sponsor/Mentor: Jon Evans

Time: 10:00 AM  / Location: Spencer 164

The persistence of invasive plant populations can be facilitated through the repeated foraging disturbance of an invasive animal. We tested for the existence of a positive feedback loop between two non-native, invasive species. We hypothesized that feral Sus scrofa (wild hog) populations repeatedly utilized tubers of the clonal perennial, Cyperus esculentus (yellow nutsedge) as a food source and evaluated whether hog activity promoted the long-term success of nutsedge populations. On St. Catherine’s Island, GA, we compared sites disturbed by hogs to undisturbed sites for nutsedge culm density, tuber density, and percent cover of native plant species over a 12 year period. Hogs returned to sites approximately every 5 years, removing live plant cover of native species in their disturbances and promoted the vegetative persistence of nutsedge over this period. Our results demonstrate a novel biotic mechanism for increased persistence of invasive species in native communities.

The Effects of Income Inequality on Political Participation: A Contextual Analysis
James Szewczyk
Department of Politics
Faculty Sponsor/Mentor: Melody Crowder-Meyer and Paige Schneider

Time: 9:00 AM  / Location: Spencer 251

This paper looks at the effects of income inequality at the community level on political participation. I find that a high level of inequality at the community level has no effect on individually based participation, but it diminishes socially based participation among individuals with a low socioeconomic status (SES). Voting, on the other hand, actually increases among low SES individuals as inequality at the community level increases. I theorize that low SES individuals are excluded from the most social types of participation in high inequality contexts due to a lack of a sense of belonging in these communities and a difference in preferences with high SES individuals. These findings contribute to a renewed focus on contextual effects in political behavior research and a more full understanding of the effects of income inequality on participation.
**ABSTRACT C2**

*The Politics of Global Health: An Analysis the Factors that Influence the Global Political Prioritization of Global Health Issues*

Rachel Schuman  
Department of Politics  
Faculty Sponsor/Mentor: Amy Patterson and Timothy Ehresman

Time: 9:15 AM / Location: Spencer 251

What allows certain health issues to gain global political prioritization? This is a central question to the study of global health governance. In a world of finite resources, it is impossible to allocate equal resources and attention to the vast number of global health issues. This has created a system of inequalities in which some issues are highly prioritized, while others are grossly neglected in the international system. This study analyzes the factors that have allowed HIV/AIDS to receive global political prioritization, and the factors that have hindered cervical cancer and cardiovascular disease from gaining equivalent global political prioritization. I will analyze five factors that I hypothesize will effect global policy setting, including 1) power of the actors, 2) political context, 3) frames, 4) characteristics of the issue, and 5) the media. Through this study, I seek to gain a more holistic understanding of the factors that effect global health policy setting.

**ABSTRACT C3**

*Voluntary Associations and Social Capital Among the Homeless: A Study of the Political Implications of Client-Status*

Kiela Crabtree  
Department of Politics  
Faculty Sponsor/Mentor: Melody Crowder-Meyer

Time: 9:30 AM / Location: Spencer 251

Building on the work of Robert Putnam, which connects higher levels of social capital to higher levels of political participation, I frame my honors thesis research around these concepts and their interaction with voluntary associations, asking if a relationship exists between client-organizational relationships, political participation, and social capital. I use original and previously collected survey data to measure levels of social capital and participation in sample populations of volunteers and predominantly homeless clients. While volunteers have higher levels of political participation and social capital, clients are more interested in politics. Both groups have positive relationships between number of associations, levels of social capital, and levels of participation. These findings have significant implications for how voluntary associations may be used to politically mobilize groups marginalized from the electorate by resource barriers.

**ABSTRACT C4**

*Civil Religion: The Competing Political Voices in the Black Community*

Paniz Rezaeero  
Department of Politics  
Faculty Sponsor/Mentor: Andrea Hatcher and Melody Crowder-Meyer

Time: 9:45 AM / Location: Spencer 251

Political elite often have an incentive to use religious rhetoric when speaking to their electorate on issues that hold elements of morality. In this regard, American political thought is infused with religious symbols and values. However, there exist varying strands of civil religion which I identify as the prophetic and the priestly strand. In this thesis, I studied the use of civil religion within the Black community by comparing Senator Tim Scott, the Black Republican Senator of South Carolina, to Leader James Clyburn, a Black Democratic congressman of South Carolina. This thesis assesses the intersectionality of Scott's and Clyburn's racial, religious, and partisan identities, ultimately answering whether Scott and Clyburn employ the priestly or prophetic function in political discourse.
**ABSTRACT C5**

**Mums the Word: An Analysis of the Portrayal of HIV/AIDS in Mainstream and LGBTQ Media**

Taylor Yost  
*Department of Political Science*  
*Faculty Sponsor/Mentor: Amy Patterson*

Time: 10:00 AM / Location: Spencer 251

Although thirty years have passed since the HIV/AIDS epidemic was recognized, few studies have examined the media’s coverage of the disease. These studies focused on the change of coverage over time or the disease’s portrayal in Africa. My research closes this gap by addressing the following question: what emotionally loaded words/phrases did mainstream and LGBTQ media use when discussing HIV/AIDS from 1981-1989? I answer this by examining articles from both mainstream and LGBTQ news sources from that time period and quantifying different types of emotionally loaded words/phrases. The expected findings are that the mainstream press used a wider variety of emotionally charged phrases/words, the LGBTQ media outlets were more informative by using less emotionally charged words/phrases, and mainstream media outlets placed blame on those living with HIV/AIDS while LGBTQ media placed blame on those who should address HIV/AIDS.

**ABSTRACT D1**

**The Culture of Play: A Means of Future Worth in Henry County An Ethnographic Study**

Erin Smolskis  
*Department of Education*  
*Faculty Sponsor/Mentor: Mae Wallace*

Time: 9:00 AM / Location: Spencer 262

At Cumberland Elementary School in Henry County, Tennessee, children’s play seems to be leisurely, but this play reveals a cultural theme: an attachment to place perpetuated by the need to be physically close to one’s family. Play at and outside of the school serves to develop abilities that allow children to be successful members of their local community. This presentation argues the following: development of athletic talent allows children to serve their community and provides opportunities for future benefits; the practice of skills related to hunting offers students an aptitude that ensures their worth in their households; what children view as worthwhile career aspirations depends upon their ability to remain in Henry County. Evidence from field notes from members of the Advent Semester 2014 Anthropology of Education course support these arguments, which culminate in the conclusion that play reflects a desire to succeed in students’ native community.

**ABSTRACT D2**

**Home-space**

Monique Stitts  
*Department of Art & Art History and Environmental Studies*  
*Faculty Sponsor/Mentor: Pradip Malde*

Time: 9:20 AM / Location: Spencer 262

This research explores the connotations, emotions, people, and physical spaces associated with the idea of a space one calls home. Through a combination of photographs taken throughout my college experience and excerpts from notes taken in a Documentary Photography course, I will consider the implications of being settled into and cherished by a place, as well as the components of which it consists. By analyzing the roles of and relationships between people within a community, and the ramifications that those relationships may have on the physical space surrounding them, I will use these photographs and notes to suggest the large role that physical space plays in creating a place that conjures feelings customary to those of a home – familiarity, comfort, purpose, and love. Using these analyses as support, I will emphasize the notion that the role of physical space within a community may reinforce a person’s or a community’s motivation to protect their own place.
ABSTRACT D3

The Space Between Trees
Bea Troxel
Department of Environmental Studies, Art
Faculty Sponsor/Mentor: Pradip Malde

Time: 9:40 AM / Location: Spencer 262

Crucial to an environmental ethic (or any ethic) is accountability, which informs loyalty to place. That loyalty to place and people through specificity and story is what drives us to save, preserve, and conserve the lands and places around us. I will present a photographic essay that centers around this concept of accountability. I use portraits that contain a direct gaze between photographer and subject, emphasizing the importance of relationships that hold one to standards and to the present. The work explores the conflict between wildness and containment through portraits of people and landscape. The images of land are all somewhat contained and show signs of human use, but they also have aspects of wildness within them. This essay urges one to evaluate the presence of people or place in their life that calls them to loyalty and accountability, drawing deeply on the work of Terry Tempest Williams, Wendell Berry, and John Berger.

ABSTRACT D4

Exploring Human/Environment Relationship through Photography
Allison Horick
Department of Environmental Studies & Art
Faculty Sponsor/Mentor: Pradip Malde

Time: 10:00 AM / Location: Spencer 262

We shape our environment but our environment also shapes us. Increasingly, however, it seems our impact on the environment is disproportionate. Through this body of work I seek to explore the human-environment relationship, how we inhabit a space, and what it means to be wild. Throughout the work, I juxtapose human and plant portraits as a way to explore the concept of giving to and taking from the land. Some pieces directly explore our interactions with the natural world while others hint at less obvious relationships. Overall it seeks to strike balance between the increased homogeneity that urbanization spreads and the wildness inherent in every living thing. I draw inspiration from the photographic works of Edward Weston, Sally Mann, and Imogen Cunningham.

ABSTRACT D5

Gustav Klimt's Judith and the Head of Holofernes: A Symbolist Approach to the Femme Fatale
Elizabeth Cowgill
Department of Art History
Faculty Sponsor/Mentor: Jeffrey Thompson

Time: 10:20 AM / Location: Spencer 262

This project investigates the symbols embedded within Gustav Klimt's 1901 Judith and the Head of Holofernes that align it with the scientific and cultural climates of turn-of-the-century Vienna. Through a thorough exploration of Symbolism, a movement more readily identified by its unique philosophy than any particular artistic style, Judith-as a femme fatale-emerges as representative of male anxiety regarding the capable and sexually self-aware woman. Despite her portrayal as one of these dreaded femme fatales, Klimt grants Judith dignity befitting a biblical heroine without relinquishing her sexuality or transforming her into a monster, the preferred Symbolist method for exposing seductive, yet nefarious woman. Klimt's unusual interpretation of Judith is the result of a curious mix involving developments in psychology, Klimt's own prominent role within Viennese society, and the semantics of Symbolism itself.
Progression or Not: Gender Representation in Disney Princess Films
(Amanda) Michelle Howell
Department of Anthropology
Faculty Sponsor/Mentor: Donna Murdock

Time: 10:40 AM / Location: Spencer 262

My proposal seeks to investigate the role of Disney princesses in film to dissect the historical significance of female representation in Disney “princess” films. My central goal is to explore if a change or shift in the portrayal of Disney's Princess films occurred. If so, when did the change occur, and how was the change portrayed? Progression in representation refers to a shift or shifts of women's roles. Therefore, I am asking if Disney princesses have progressed from “traditional,” feminine performances of gender to embody gender-neutral performances. This project investigates if Disney princesses in the last five years exemplify “feminist” characteristics. Using Disney princesses as gender based subjects, I seek to explore the relationship between historical moments and the representation of Disney princesses. Additionally, this analysis will demonstrate how film can be framed as a feminist medium along with the search for identity and subjectivity in “patriarchal” culture.

Peace without Reconciliation: Religious Identity, Structural Violence, and the Northern Ireland Conflict
Hannah Boschert
Department of Religious Studies
Faculty Sponsor/Mentor: Sid Brown

Time: 9:00 AM / Location: Spencer 271

Despite the peace agreement of 1998 and the cessation of organized violence, peace walls continue to serve as a means of division – enabling and solidifying religioethnic sectarianism. Through my research I investigate 1) The history of the present - the last 16 years of distrust and logjams within the Northern Irish government. 2) The long history - examining identity and violence of the past. 3) The Peace Walls and murals - analyzing the reification of religioethnic identity and ‘bad blood.’

Franco’s Spain in Buero Vallejo
Ahmad El-Bobou
Department of Spanish
Faculty Sponsor/Mentor: Ruth Sánchez-Imizcoz

Time: 9:20 AM / Location: Spencer 271

Spain under the dictatorship of Francisco Franco was not the optimum incubator for any form of art that implicitly critiqued oppositional politics. Although this happened to be the case, clever artists found ways to make their audience understand their society and wake up to what was happening around them. In this study, I analyze the way in which Buero Vallejo uses the narrative of one of Spain’s most famous artists, Francisco Goya, in his work titled “El sueño de la razón” as a vehicle to critique three aspects of Spanish fascism and their consequences on Spanish society: 1) Censorship, 2) Military Control, 3) the Role of the Church.
ABSTRACT E3

STAR Students Community Project: English as Second Language for Native-Spanish Speakers at Tracy City Elementary

Jinni Tran, Mary Perez, Alex Macias, Andrea Ortiz

Department of Spanish

Faculty Sponsor/Mentor: Manuel Chinchilla

Time: 9:50 AM / Location: Spencer 271

The overall purpose of this program is to develop a concrete space for intersectionality between languages where young students of diverse backgrounds can enhance their language skills to exceed in their current academic environment. We were able to meet the students and deliberate their difficulties with the language barrier. Our program complements what the student will be learning in school and provide one-on-one attention. We help the students with homework, answer their questions, listen to their doubts, and give them extra practice by reading, writing, and conversing with them in English. Because we tutors can speak Spanish, we become a source of comfort, familiarity, and consistency to kids who experience constant uncertainty due to language barriers and cultural differences.

ABSTRACT E4

Is Vogue Ballroom a “Sinking Ship”?

David Terrell

Department of Theatre

Faculty Sponsor/Mentor: Courtney World

Time: 10:10 AM / Location: Spencer 271

Since the late 1800’s, vogue ballroom culture has been an underground society where gay men come together to forget the realities of the world and enter into fantasy. From its origins, the history and purpose of the culture was to celebrate freedom of expression and creativity for LGBT individuals of color to have fairness in competition (known as “balls”). The culture has been the production grounds for rights, slang and phrases, dance creations, and grand performances. These products have each influenced surrounding communities in dance, fashion, and pop culture. Some of these significant contributions have also caused conflict for the progression of the scene, leading participants to wonder is it a “sinking ship?” Through an oral presentation, I will examine the current state of vogue culture. This will be followed by a dance performance that recreates the experience of a vogue production. Both aspects of the presentation will highlight the glories and the downfalls of the scene.

Performance will include explicit movements and words.

ABSTRACT F1

“Tormented Transformations: The Realization of Actaeon in Shakespeare’s Twelfth Night”

Blair Johnson

Department of English

Faculty Sponsor/Mentor: Pamela Macfie

Time: 11:00 AM / Location: Gailor 130

In Twelfth Night’s opening scene, Duke Orsino establishes a tone of love-sick trauma by alluding to Ovid’s Actaeon, the huntsman who stumbles upon the goddess Diana at her bath and, as a result, is transformed into a stag that is hunted and killed by his own dogs. Orsino, as many have observed, presents himself as a transformed Actaeon, one hunted and tormented by his unrequited desire for the chaste Olivia. Despite such macabre brooding, the Duke quickly sheds such desire at the play’s close, where he agrees to marry Viola. By contrast, the steward Malvolio, who also pines for Olivia, does not have his desire alleviated in the play’s final scene. Although Orsino compares himself to Actaeon in his torment over Olivia, emphasizing that he shares the hunter’s dehumanizing experience, the true reincarnation of Actaeon in Twelfth Night draws us to Malvolio, whose narrative ends in tragedy, not comedy.
ABSTRACT F2

“Desire, Deceit, and Manhood in Shakespeare’s Othello and Metamorphoses 9”
Robin Lee
Department of English
Faculty Sponsor/Mentor: Pamela Macfie

Time: 11:15 AM / Location: Gailor 130

Love and jealousy are inextricably entwined in Shakespeare’s Othello, much as desire and deceit are in Book IX of Ovid’s Metamorphoses. Desire leads to love, and deceit begets jealousy. The language of violent consumption surrounding these passions in these works hint at both love’s capacity to validate masculinity and jealousy’s potential to emasculate. Jealousy lives within love, ever fearful of losing what has been gained. In this context, Othello’s handkerchief and Nessus’ tunic operate as “insurance policies” and “guarantees” for nervous lovers. Yet jealousy allows these love tokens to overwhelm love itself, causing the loss of the very thing the amulets are meant to protect. This essay argues that Shakespeare’s mythologically literate audience would have recognized Othello’s “magical” handkerchief as a new version of Nessus’ tunic; steeped in blood and unpredictable mystery, each fabric token causes love itself to be re-fabricated.

ABSTRACT F3

Divine Detriment and Truncated Rite: An Inquiry into the Laments of Ovid’s Niobe and Shakespeare’s Lear
Ansley McDurmon
Department of English
Faculty Sponsor/Mentor: Pamela Macfie

Time: 11:30 AM / Location: Gailor 130

King Lear’s final lament, which bemoans the injustice of innocent death, closely mimics Niobe’s dirge in Metamorphoses 6. Comparisons between these sorrowful sovereigns speak to the nature of self-important anti-ritualism and the demise it invites. Like the Theban queen, Shakespeare’s once powerful king falls prey to grievous misfortune after rejecting sacramental ritual. For each character, abbreviated rituals serve as visible manifestations of self-indulgent pride; these transgressive acts destroy familial relations as one of these consequences, illuminating the particular sources of Lear and Niobe’s ill-fated conceit.

ABSTRACT G1

Harmonious Contradictions in Gerard Manley Hopkins’ “I wake and feel the fell of dark, not day”
Anna Lane
Department of English
Faculty Sponsor/Mentor: Lauryl Tucker

Time: 2:30 PM / Location: Spencer 151

Hopkins’ poem “I wake and feel the fell of dark, not day” seems to contain a fundamentally incoherent nature, demonstrated by three separate yet relating trajectories. Ultimately, the incoherent nature of this poem is a deceit. An apparent shift in tone midway through is not a shift—it is an expression of two kinds of grief. A strange progression of figurative language, which signals increasing distance instead of closeness, shows that as the speaker emphasizes his isolation and exteriority, he actually journeys inward toward a spiritual interiority. Various pronouns and odd personae serve to emphasize the speaker’s consistent isolation from beginning to end. The speaker emphasizes distance figuratively while simultaneously revealing his desire to collapse the distance he feels between himself and God. In the end, the seemingly asymmetrical tensions in this poem are invalidated, and all that is left is order, certainty, and direction.
MASCUINITY AND MISOGYNY IN SIR GAWAIN AND THE GREEN KNIGHT

Colin Harper
Department of English
Faculty Sponsor/Mentor: Matthew Irvin

Time: 2:50 PM  / Location: Spencer 151

Courtly Romance in Sir Gawain and the Green Knight is defined by subversions to sexuality and gender. In this paper, I explore these subversion and the intricacies of medieval courtly romance when applied to Gawain’s relationship with a fellow nobleman’s wife, Lady Bertilak. Specifically, the paper examines the relationship between trust and love at the expense of sexual desire, while also contending that the poem implies the inseparability of this trust-love dynamic. From this inseparability, the reader sees an inversion of the typical male dominated power structure of the medieval period, and the emasculated Gawain it produces exposes the knight’s surprising misogynistic outlook. To understand the complexities of this courtly relationship and Gawain’s misogyny, a detailed reading of the character’s motives and the poem’s Biblical allusions are stressed, while further research into the geography and courtly tradition of the poem’s setting are also emphasized.

WONDER YE THEN AT THE FIERY HUNT: MONASTICISM & CALLING IN MELVILLE’S MOBY-DICK

Kayla Deep
Department of English
Faculty Sponsor/Mentor: John Grammer

Time: 3:10 PM  / Location: Spencer 151

While many have delved into the religious symbolism in Herman Melville’s Moby-Dick, this piece hopes to further analyze the specifically monastic undertones in Melville’s greatest work. Melville would have been familiar with the monastic tradition, as is evidenced in his family history and in works such as Benito Cereno. Though Melville would have been in the midst of a storm of nineteenth-century anti-Catholicism, Moby-Dick’s celebration of the monastic values of poverty, chastity and obedience, combined with a sincere appreciation for sense of place and complete stability, transforms the sea-men’s journey to a life of brotherhood. Through Ishmael’s exploration of intimacy, the brothers of the ship transcend to a higher understanding of themselves, their newfound community, and the unknowable realm of the sea that has become their book for study. Keywords: Moby-Dick, Melville, monasticism, poverty, hardship, Catholicism, anti-Catholicism

OMNIPOTENCE IN THE ROMAN DE LA ROSE: AN EXPLORATION OF THE MEDIEVAL COURTLY LOVE TRADITION

Sara Kachelman
Department of English
Faculty Sponsor/Mentor: Matthew Irvin

Time: 3:30 PM  / Location: Spencer 151

This research focuses on themes of omnipotence in medieval courtly love through the lens of the French poem The Roman de la Rose by Guillaume de Lorris and Jeun de Meun. The medieval poem, designed as a dream vision, allegorizes a rose as a symbol of female sexuality. In the allegory, a male pursuer gives his allegiance to the God of Love in return for the Rose, a pledge that leads to recurrent trials and detours. While pleasure may be the object of love, we learn through the lover’s prolonged plight that pleasure, itself, is only made valuable by its constant deferral. By examining the love-as-master relationship allegorized by the male pursuer and the God of Love, this research explores omnipotence as the primary method of detour in the courtly love tradition.
**ABSTRACT H1**

Jay McChesney  
Department of International & Global Studies  
Faculty Sponsor/Mentor: Timothy Ehresman and Aaron Elrod

Time: 2:30 PM  / Location: Spencer 262

The BRIC coalition was first proposed as an attractive destination for investment in emerging markets. This construct has now been cited as the likely leadership of the ‘global south’. Among the BRIC countries, I argue that Russia and China’s authoritarian actions disqualify them from being perceived as legitimate leaders of the global south in the international arena. Domestic energy reform aimed at increasing transparency and investment in India and Brazil is a necessary pre-condition for these countries to be perceived as legitimate leaders of a coalition of developing countries in international environmental politics, an increasingly important realm of diplomacy. Both India and Brazil are large developing democracies that have both the political and economic clout to become leaders of the global south and be perceived as the voice of the developing world as the global system transitions to one that is accountable to a greater array of people and values.

**ABSTRACT H2**

Is Developing a Strong NCAA Division I-A Football Program a Cost Effective Marketing Tool for US Colleges and Universities?
MaKayla Cardwell  
Department of Economics  
Faculty Sponsor/Mentor: Marc St-Pierre

Time: 2:50 PM  / Location: Spencer 262

Elite athletic performance increases the media attention and publicity that colleges and universities receive. Though there are significant advantages, both through advertisement and monetary prizes, to developing a strong NCAA Division I-A Football Program, is it a cost effective form of advertisement? In this paper we examine the effect of performance in football on admissions applications for undergraduate first year students. College athletic teams in the Big Ten, Pacific Twelve, and Southeastern Conference prior to 2012 were chosen as subjects. The number of undergraduate first year admissions applications for the following two years were then compared for each of the subjects from 2001 to 2013. Winning a conference championship has a positive relationship with the number of applicants one and two years after the win, on average.

**ABSTRACT H3**

The Study of Success at the US Box-Office in the Motion Picture Industry and Its Factors
Yue Liu  
Department of Economics  
Faculty Sponsor/Mentor: Marc St-Pierre

Time: 3:10 PM  / Location: Spencer 262

We examined the performance of motion pictures released in the United States between 2010 and 2014. The sample contains 300 motion pictures that have highest box office revenues in the States. In our research, we explore factors such as star power, academy nominations and awards, production budget, genre, sequel, critics’ review, release time, IMAX, and 3D. Regression results indicate the primary determinates of success box office are star power, production budgets, and Critics’ Review.
**ABSTRACT H4**

**Thrive 2055 Natural Treasures Initiative Project**

Seminar in Environmental Studies, Beatrice Troxel, Elise Harrigan, Mallory Grimm, Catherine Hargrove, Allie Horick, Nicki Hubbard, Jamie Sue Wilson, John Black, Sara McIntosh, Monique Stitts, Laura Murray, Pierce McGrady, Sara Best, Sarah Bailey

*Department of Environmental Studies*

*Faculty Sponsor/Mentor: Daniel Carter*

Time: 3:30 PM / Location: Spencer 262

As an aid to the Thrive 2055 initiative, this project focuses on four areas in need of conservation in the Chattanooga area. We report on the Conasauga River Watershed, the Cumberland Plateau and Cumberland Park, Eco-Tourism of the Chattanooga area, and Outdoor Recreation of the Chattanooga area. Interviews were conducted with personnel related to each area to gain an understanding of the current condition each area is in, as well as what measures need to be taken in order to properly conserve these initiatives. Our goal is to tell the story of these places through interviews and photographs so that the cultural, biological, and recreational assets of each region will be better understood. We aim to focus on why each resource is so important and what kinds of change people want to see in the next 40 years.

**ABSTRACT I1**

**The Evolution of Jihad in Constructing a 21st Century Umma**

Roger Chase Hagans

*Department of History*

*Faculty Sponsor/Mentor: Nicholas Roberts*

Time: 2:30 PM / Location: Spencer 251

Dr. Marc Sageman has argued that we must locate terrorism and extremism in local conflicts rather than sweeping ideological narratives, and that the US created ISIS in the course of invading Iraq. This paper argues that pre-existing ideological narratives regarding the role of violence in creating an Islamic state predated the war in Iraq and traces the legal and religious codifications of jihad as the means to shape the umma from the radical revisions of Muslim Brother Sayyid Qutb through the foreign fighter movement facing the Soviets in Afghanistan to the relative decline in prominence of al-Qaeda within the jihadist movement, that were given opportunity to become manifest in the chaos unleashed in Iraq after 2003. In this regard, ISIS represents a new unique current within an Islamist context that does not seek to represent the umma, but re-forge a new one that is informed by its ideological doctrinal heritage.

**ABSTRACT I2**

**Extending Citizenship: Narratives and Voices in Haitian National Identity**

Sarah Flowers

*Department of History*

*Faculty Sponsor/Mentor: Andrea Mansker*

Time: 2:50 PM / Location: Spencer 251

Continuing my thesis work on national identity as expressed in discourses of race and gender in the Haitian Revolution, my current work explores 20th-century Haitian novel writers. Literary works that create national mythology are acts of sovereignty, attempts to write or rewrite narratives of state creation and its significance. Haiti’s historical record reveals gaps in scholarship at chronological intervals, for specific populations, and with certain frameworks. I thus attempt to improve my own work by extending my research past the Revolutionary period and by locating narratives of Haitian authors in their complex contexts. I assess works by men authors against what scholar Mimi Sheller labels the “masculinization of power” generated by post-Independence military government and patriarchal legal rhetoric, a reclaiming of masculinity at the expense of republican values. I also examine Haitian women’s narratives as they write their own histories into the history of their nation.
Self-Definition and Citizenship Education: The Cumberland Center for Justice and Peace in Sewanee, Tennessee
David Prehn
Department of History
Faculty Sponsor/Mentor: Houston Roberson

Time: 3:10 PM / Location: Spencer 251

This research project is really more of a study of community dynamics than purely civil rights; however, the foundations of the Center cannot be separated from the local civil rights movement. This study of the CCJP, Sewanee’s local peace organization, is centered around the connections and involvement between the CCJP’s early founders and the Highlander Folk School in Monteagle. As an institution ahead of its time, prizing self-definition and education-for-citizenship at a time when the Civil Rights movement was largely concerned with legal changes (pre-1965), Highlander’s ideologies were picked up by the CCJP’s early founders to establish a peace organization that would challenge Sewanee to think more intentionally about identity and citizenship. The CCJP has continued the work of Highlander: this research has indicated the way in which the CCJP has given structure and modernity to the ideals of self-definition and civic empowerment so crucial to social integration.

Challenges and Changes to the Identity of American Catholic Nuns: Reproductive Rights, Gay Rights, and the AIDS Epidemic
Claire Forbes
Department of History
Faculty Sponsor/Mentor: Julie Berebitsky

Time: 3:30 PM / Location: Spencer 251

This research project began in attempt to answer a follow up question from my original thesis: what happened for American Catholic nuns after the second wave feminist movement was over? The identity of American sisters has been in a state of flux since the closing of Vatican II in 1965. These women, much like secular citizens, were faced with the ideological challenges brought by civil rights, feminism, and later, as this project examines, the reproductive rights movement, the fight for gay and lesbian rights, and the HIV/AIDS epidemic. This project argues that while nuns experienced these movements in unique ways, the times that they publicly spoke up and fought for what they believed was right for society completely shattered the conception of a stereotypical sister. Ultimately, this project examines the intersection of faith, gender, and sexuality and finds that the gap between religious and secular life is much smaller today than the average person thinks.

APPALACHIAN STREAM SALAMANDER BEHAVIORS CHANGE FOLLOWING RIPARIAN DISTURBANCE
Margaret Bliss, Kristen K. Cecala
Department of Biology
Faculty Sponsor/Mentor: Kristen K. Cecala

Time: 2:30 PM / Location: Spencer 164

Human activities frequently result in wildlife declines, yet animals continue to persist at low densities in impaired environments. Because habitat selection behaviors maximize an individual’s fitness, evaluating the behavior of animals that inhabit degraded habitats provides insight into wildlife declines and targets for management. We evaluate whether habitat selection behaviors differed between individuals from disturbed and undisturbed habitats. We evaluated the potential selection by blackbellied salamanders (Desmognathus quadramaculatus) to different contexts depending on the riparian forest. Salamanders from deforested streams were less responsive to light and exhibited greater reactivity and had had poor body conditions, indicating that they are suboptimal relative to forested habitats. Although salamanders decline following riparian disturbance, our results
ABSTRACT J2

Water quality monitoring of Harrison Spring in Sewanee, Tennessee
Tia Strickland
Department of Chemistry
Faculty Sponsor/Mentor: Emily White

Time: 2:50 PM  / Location: Spencer 164

Harrison Spring, located on Hat Rock Road, has served as a source of water for the local community, as both drinking water and for its believed “healing” properties. Preliminary data indicates the presence of fecal indicator bacteria in the spring water with higher counts observed following rain events. Due to its significance to the community, a water quality monitoring study was undertaken in June and July 2014. Samples were collected from the spring outflow pipe (where water is collected for drinking), the receiving stream, and a pool in the source cave. Samples were tested for pH, conductivity, dissolved oxygen, total coliforms, *E. coli*, reactive phosphorus, acid-hydrolysable phosphorus, total phosphorus, nitrate, nitrite, ammonia, and total nitrogen. Spikes in *E. coli* counts and conductivity were observed following rain events with the highest bacterial counts found in the stream. During one sampling event, nitrite was found to exceed the drinking water standard.

ABSTRACT J3

Sewanee Interactive Campus Map
Sewanee Computing Society: Austin Arnold, Hunter Stocker, Ryan Regal, Nasko Apostolov
Department of Computer Science
Faculty Sponsor/Mentor: Lucia Dale, Jason Voigt, and Stephen Carl

Time: 3:10 PM  / Location: Spencer 164

How cool would it be if we had an app on our phones to help us navigate Sewanee? For those of us who have spent some time on the Mountain such an app would come across as unnecessary. Our clustered, residential campus does not seem to need any navigational tool. After all, Fulford is across the street from All Saint’s and Woods is just 2 minutes away from the library. These directions, however, tend to confuse rather than help Sewanee visitors who have never set foot on the Domain. Therefore, the Sewanee Computing Society decided to create an interactive campus map which turns Sewanee into an easily accessible place for newcomers. Our mobile application lets users choose an origin and a destination and draws a route between the two points. We also implemented geolocation which allows the user to be tracked and guided from their current location to a destination of their choice. We are turning Sewanee’s digital map into a colorful and friendly place which reflects our diverse culture.

ABSTRACT K

More Than Two: An Informal Showing of Dance Choreography
Ellie Clark, Zack Gardner, Arthur Ndoumbe, Hilary Smith, Fridien Nana Tchoukoua
Department of Theatre Arts and Speech
Faculty Sponsor/Mentor: Courtney World

Time: 2:00 PM  / Location: Tennessee Williams Center Dance Studio

Dance Composition students will present works featuring more than two dancers. Drawing inspiration from visual arts, music, narrative, props, and physical/kinesthetic impulses, these projects highlight the creative implementation of compositional structures in dance-making. Additionally, David Terrell will present “House of Desire,” an original production replicating the Vogue Ballroom experience. Immediately following the performance, the audience will be invited to engage with the artists in a talkback session.
Discovering Cultures Through Music
Dr. Sidney A. King

Time: 3:00 PM / Location: Gailor Auditorium

Music is a universal language. It communicates ideas and emotions pertaining to the human experience across geographical, political, and language barriers. A study of the music of cultures gives a window to greater understanding of those cultures. The creation of the musical composition Tangos Descarados, has provided an opportunity to gain greater understanding of Latin American cultures. In capturing the energy and ideas of this music, the perspective of the American composer also influences the outcome, and the music evolves to mirror the manner in which cultures interact on a global scale. Tangos Descarados has been commissioned by the Sewanee Symphony Orchestra and will be premiered on April 24, 2015 at 7:30pm

¡Concierto! Musics from Latin America
Department of Music
Faculty Sponsor/Mentor: César Leal

Time: 7:30 PM / Location: Guerry Auditorium

A festive selection of Latin American music including the world premier of Tangos Descarados
ABSTRACT 1

Spotted Salamander Eggs
Hadley Montgomery, Katie Sutton
Department of Environmental Studies
Faculty Sponsor/Mentor: Christopher Van de Ven and Dr. Kristen Cecala

We created an interactive map showing the abundance of Spotted Salamander eggs in ephemeral pools on the domain. Each of the twenty-one ephemeral pools on the domain was manually surveyed for egg sacs using waders and nets in early to mid April. In our initial surveys, we found that the number of egg sacs in the ephemeral ponds ranged from 206 to 0 across the Domain. The interactive online map allows the user to compare the numbers and distributions of egg sacs. The data that we collected will provide an opportunity for this project to be potentially expanded along with ongoing research to become a full survey of eggs sacs in correlation with the number of female Spotted Salamanders in all of the ephemeral pools on the domain.

ABSTRACT 2

The Effect of Development on Water Flow from the Sewanee Utility District
Christina Quinn
Department of Environmental Studies
Faculty Sponsor/Mentor: Christopher Van de Ven

GIS was employed to create a map that shows the current and predicted future flow of water from the Sewanee Utility District. Fresh water and wastewater lines and their capacities are mapped with existing structures and potential developments. Planned developments include the Van Ness dorm and downtown development outlined in the 2014 Sewanee Village Action Plan. The map will potentially include data on water use for existing buildings as well as estimates for proposed buildings. Water use data further illustrates the existing flows of water to and from structures on the Domain and will aid in the prediction of future freshwater and wastewater flows when developments are serviced by the Sewanee Utility District. This map will be a component of my senior capstone research about the availability of water to support development and population growth on the Domain.

ABSTRACT 3

Recording the Northernmost Part of the University's Cemetery
Annika Catherine Sinclair Derham
Department of Environmental Studies
Faculty Sponsor/Mentor: Christopher Van de Ven

This project documents Northern portion of the University Cemetery was recorded and made available online as an interactive map. Starting with a basemap created in 1975--then updated in 1981 respectively by S.P. Scoville and Frederica Wood--each family plot and the location and data (names, dates, inscriptions) from each individual gravestone were recorded. Many of the tombstones were cross referenced with documents from the Archives and supplemented with information from Dr. Gerald Smith and Mr. James Gipson. The end product is an updated map of the Northernmost 234 Graves, located within 82 Grave Plots, the recording of the information on the stones, and a photograph of each plot. All of the data has been made available on an interactive web map to help preserve and support the history of the University, and the deceased.
ABSTRACT 4

Carter Farm: Best Management Practices
Zachary Cope
Department of Environmental Studies
Faculty Sponsor/Mentor: Christopher Van de Ven

The purpose of the study was to make an interactive map of Dr. Carter's cattle farm near Jasper, TN. The map was aimed to promote the best management practices in use at Dr. Carter's farm. An aerial photograph and GPS data were used to map out his pastures and the area of each pasture was calculated. More GPS points and pictures were taken on site at important locations on the farm to highlight landmarks, interesting features, and management practices. The interactive map allows users to click on points and pastures to see what the area looks like and to get a description of the areas importance. The goal of the project is to allow consumers that care about the origins of their food, to have a clear image of farming practices used to produce Carter Beef.

ABSTRACT 5

Classic Sewanee Cycling Routes
Ethan Burns
Department of Environmental Studies
Faculty Sponsor/Mentor: Christopher Van de Ven

Surrounded by miles of low trafficked country roads and state highways, Sewanee is an ideal home base for beginning and experienced road cyclists alike. As there are literally thousands of possible road rides that start in Sewanee, this map was designed to provide the user with the 10 most popular Sewanee rides. Use it to find new roads but do not limit yourself to the routes shown. Get on your bike and explore! Created using Google Maps and Google Earth, the map is saved as a Google Earth kmz file allowing it to be easily downloaded and shared. Each ride folder provides a short ride description with a few helpful ride notes, an elevation profile, a link to printable and editable directions (beta sheets) as well as starting and ending markers. Enjoy!

ABSTRACT 6

This is New Africa: The Cultural Politics of a Burgeoning Social Movement
Sharazade Balouchi
Department of International and Global Studies
Faculty Sponsor/Mentor: Donna Murdock and Michael Wairungu

This is New Africa (TINA) is a social movement founded by Afrobeats artist Fuse ODG. TINA aims to counter the dominant discourse on Africa put forth by popular media in the West by subverting stereotypes and showcasing the continent in a new light. My research performs a preliminary analysis of the sounds, lyrics, and images presented in Fuse ODG’s music and reveals five key ways in which TINA’s discourse on Africa differs from that of Western popular media: 1) the deterritorialization of African space 2) broadening portrayals of gender 3) establishing Africans as active global participants and defying notions of cultural purity 4) challenging dominant language ideologies 5) erasing images of poverty. With strong West African influences and increasing popularity in the United Kingdom and Canada, TINA is increasing its transnational presence. However, I also consider the ways in which the TINA discourse reproduces the same stereotypical images of Africa that it works against.

ABSTRACT 7

Modeling and Producing Plasmonic Nanostructures
Frank Odom III
Department of Physics
Faculty Sponsor/Mentor: Eugenii Donev

Using a Lloyd’s mirror interferometer, I have created lithographic patterns, which are then used to produce silver-based nanostructures. Metal nanostructures are particularly interesting, because they possess optical and electrical properties that are largely size-dependent. I will be discussing the theoretical background of metal- based plasmonic nanostructures, as well as my methods for fabricating these structures and simulating their optical properties.
Numerical Methods of Electronic Band Structure Calculations
Frank Odom III, Dr. Khorgolkhuu Odbadrakh
Department of Mathematics and Computer Science
Faculty Sponsor/Mentor: Chris Parrish and Randolph Peterson

One would be hard-pressed to find many modern technologies that do not utilize silicon technology. A single electronic device may contain upwards of thousands of individual semiconductor chips. Physicists and chemists seek to better understand these materials by studying their electronic band structures. Computational methods exist by which we can numerically calculate the electronic properties of crystalline materials like silicon. I have researched one of these methods in particular, known as the pseudopotential method. By solving Schroedinger's equation, it is possible to obtain an estimate for the energies of electrons in various electronic orbitals. By understanding these calculations and their results, we are able to learn about the physical processes that govern silicon technologies, among other things.

Sexual Liberation and HIV transmission in China
Yiruo Zhang
Department of Politics
Faculty Sponsor/Mentor: Amy Patterson

This paper examines four factors in present-day China to explain the country's phenomenally increasing rate of sexually transmitted HIV/AIDS cases in the past decade: 1) liberal sexual attitudes among young women has moved away from the conventional rejection of premarital sex; 2) there exists a growing pattern of casual sexual relationships among young Chinese, including risky sex dates with strangers; 3) the de facto existence of commercial sex work industry has wildly spread throughout the nation; 4) Chinese living in contemporary society have showed increasing acceptance of homosexuality. The study uses as its methods case studies of a feminist movement, The Vagina Monologues, and a popular dating app, Momo, policy analysis of regulation of prostitution, and LGBT surveys in China. It argues that the liberal attitudes, a growing pattern of risky sex, the spread of prostitution, and the acceptance of homosexuality have caused the increase in sexually transmitted HIV/AIDS in China.

The Male Gaze and Female Eating Behavior
Elise Anderson, Erin Neil
Department of Psychology
Faculty Sponsor/Mentor: Al Bardi

The current study examines the effects of male presence on female eating behavior. Thirty-four female college undergraduates participated in the within-subjects experiments. Participants were exposed to both treatments over a period of two class periods. After being told they were participating in a study on subliminal messaging in females, either male or female experimenters offered them pretzels before a movie was shown. Pretzels were counted. A one-way repeated measures analysis of variance was calculated comparing pretzel intake to the order in which participants were exposed to experimenter gender. These findings support the hypothesis: women took less of the provided snack in the presence of males than in the presence of females. These results hold significant implications for the etiology and treatment of eating disorders in females.
ABSTRACT 11
Drivers of Land Management Preferences in the Southern Cumberland Plateau Region
Philip Gould  
Department of Biology and Psychology  
Faculty Sponsor/Mentor: Kristen Cecala and Jordan Troisi

People’s preferences can provide relevant information on what should be integrated into the existing land-management practices of different regions. With an understanding of stakeholders’ views, planners are able to construct future land management practices that reconcile private goals and public preferences. Previous studies have identified occupation, proximity to nature, and socio-political views as factors that influence land-conservation attitudes of surrounding communities. Our objective was to identify drivers of land-management preferences in communities in southeastern Tennessee. We designed a comprehensive mail survey delivered to 1000 residents in three counties along an urban-rural gradient. Future land managers should consider the various priorities and preferences of the communities they serve as they design management that also supports the public good and maximizes the value of natural areas.

ABSTRACT 12
Have Your Cake and Eat It Too: Emotional and Relational Correlates of Comfort Foods  
Garrett Heatherly, Casey Hassett, Jamie Chauvin, Jordan D. Troisi, Ph.D.  
Department of Psychology  
Faculty Sponsor/Mentor: Jordan D. Troisi

Previous studies support the role of social surrogates as temporary replacements for social interaction (e.g., watching a favorite television show, or eating a comfort food). The current study measured liberal arts students’ attitudes toward comfort foods via an online survey. The survey included both open-ended and close-ended questions, allowing participants to describe associations with comfort food, and measuring participant’s mood before and after consuming comfort foods. The data suggest that comfort foods decrease negative mood (e.g., loneliness), and tended to be associated with relational words (e.g., family, home, warmth, etc.)

ABSTRACT 13
Comparing a genetically modified organism with an in vivo bioreporter system  
Nathaniel Chapman, Cid Oculam  
Department of Chemistry  
Faculty Sponsor/Mentor: Bethel Seballos

Arsenic exposure can occur via contact with drinking water contaminated by natural deposits in the earth or from agricultural and industrial practices. Arsenic toxicity occurs largely due to the affinity trivalent arsenic, As (III), has for sulfur groups in amino acids, the building blocks of protein. This study was designed to compare the use of a nematode which has been genetically modified to respond to arsenic with a system in which a whole-cell bioreporter is temporarily administered to a wild-type nematode for the same purpose. Preliminary results indicate that the sensor is useful as a yes/no indicator. Further experiments will be performed to see if either sensing system is tunable to provide high/low or even incremental results and if the limit of detection for either system is below the EPA arsenic standard for drinking water.

ABSTRACT 14
Transmission Spectroscopy of Transiting Exoplanets  
Taylor Morris  
Department of Physics and Astronomy  
Faculty Sponsor/Mentor: Douglas Durig and Randolph Peterson

Exoplanets block part of the light from their host star, and this change in flux can be measured as a function of time to create a transit light-curve. Markov Chain Monte Carlo (MCMC) fitting routines can be performed on this data using the Open Source Code for Accelerating Astronomy Research (OSCAAR). These routines fit for a radius ratio of planet to star. Different wavelengths of light
will transmit differently through planetary atmospheres in accordance with basic spectroscopic principles. This will cause a different radius ratio to be measured when varying the photometric filter used on our telescopes. We acquire measured of Rp/R* at different wavelengths for several transiting planets, and compare these results with theoretical models to investigate the atmospheric composition of planets in other star systems.

ABSTRACT 15

Redbay survival ten years after infection: The role of prior land use and landscape position on St. Catherines Island, Georgia, USA
Elise Landreaux, Hali Steinmann
Department of Forestry & Geology and Biology
Faculty Sponsor/Mentor: Ken Smith

Introduced to the United States in 2002, laurel wilt is a disease that destroys the vascular system of trees within the Lauraceae family, and it is introduced to the tree by the ambrosia beetle (*Xyleborus glabratus*). This study investigated the survival of redbay (*Persea borbonia*) on St. Catherines Island, GA ten years after the initial infection of laurel wilt. We inventoried all dead and live redbay from replicated transects inside a maritime forest, an old field forest (both located on Pleistocene core), and a Holocene hammock. Soils under the maritime forest had significantly higher P and pH concentrations, and the Holocene hammock had a higher water table. Sixty to seventy percent of live redbay trees had evidence of the Palamedes swallowtail butterfly using the tree as a host species. Evidence of deer browse at all sites was low (5%). This long-term study will continue in future years to better understand the redbay response to the exotic beetle and fungus.

ABSTRACT 16

Bio-surveying the “Raccoon’s Rectum,” a Pennington Formation Cave on the University Domain
Hali Steinmann
Department of Biology
Faculty Sponsor/Mentor: Kirk Zigler

Despite the level and complexity of research in a handful of well-studied caves, there remain major knowledge gaps in the overall biodiversity of karsted regions and individual karst systems. In an effort to quantify and better understand the fauna of a Pennington Formation cave on the Domain of the University of the South in Sewanee, Tennessee, we systematically surveyed four selected cave passages in February and April for two consecutive years (2014-2015) and produced a map showing the cave’s morphology, including hydrologic sources, springs, and areas of biologic interest.

ABSTRACT 17

Mapping a new Cave
Nancy Lilly, Hali Steinmann
Department of Forestry and Geology
Faculty Sponsor/Mentor: Bran Potter, Jason Hardy, Kelly Smallwood and Sewanee Mountain Grotto

A recently discovered cave near Armfield Bluff has developed in the upper beds of the Mississippian aged Pennington formation. Due to erosion on a disconformity, the Pennsylvanian aged Raccoon Mountain formation is missing from the area and the Warren Point Sandstone directly overlies the Pennington. Narrow passages of the 1000+ ft long cave has developed along joint trends of NW-SE and N-S, which appear to parallel joints in the overlying sandstone. Using traditional tape and compass cave surveying techniques, the cave was measured and mapped by Nancy Lilly and Hali Steinmann with generous assistance and guidance from Jason Hardy, Kelly Smallwood, and Anne Grindle of the Sewanee Mountain Grotto. The geology is not the only unique facet of the cave, there are some relatively rare fossils including petalodus shark teeth, and the cave is brimming with macrobiology.
Woody biomass and energy: sustainable or destructive use of our forest?
Lorna Harkey
Department of Environment and Sustainability
Faculty Sponsor/Mentor: Ken Smith

In the Southeastern United States, woody pellet manufacturing companies are supplying biomass for electricity generation in Europe because European countries have a Renewable Energy Standard that they must fulfill each year. One measure of sustainability is the net benefit an energy source may provide to atmospheric carbon levels, and a recent study on carbon emissions indicated that in the southeastern US, it will take 35 years for woody biomass to outperform natural gas and coal. For this project, I examined a large biomass plant, Enviva, based in Ahoskie, NC and a municipal biomass plant in the northeast (Burlington Electric Department), and compared wood consumption/production rates for each site. Enviva in Ahoskie produces 350,000 metric tons of woody pellets per year. McNeil Generating Station within Burlington Electric Department harvests wood from a 60-mile radius and 76 tons of wood chips are consumed per hour to create energy.

The optimum turning angle after aircraft engine failure at a low altitude
Xinyue Dai
Department of Mathematics
Faculty Sponsor/Mentor: Catherine Cavagnaro

Engine failure in a single aircraft at a low altitude right after takeoff demands immediate reaction from the pilot. The FAA recommend procedure for a pilot is to land straight ahead, but it does not work effectively when the planes altitude is 300-1000 feet. The purpose of this study is to evaluate the possibility and feasibility of turning back after engine failure during the takeoff phase of flight in a single engine aircraft by building an analytical model with Mathematica. Then, matching the result to the analytical result done by Rogers in 1994, and by examining the influence of engine failure altitude, wind direction, velocity, and bank angle on the required runway length. The model shows that the optimum flight turning angle is a 45° bank angle at constant velocity during the turn.

Size characterization and surface modification of monolayer-protected quantum dots
Luis Tinoco, Fernando Acosta, William Wright, Sonia Francone, Ena Aguilar
Department of Chemistry
Faculty Sponsor/Mentor: Deon Miles

Monolayer-protected quantum dots (QDs) were synthesized using several water-soluble thiols. QDs were synthesized at temperatures as low as -47 °C in attempts to control the growth of the nanoparticles. The optical properties of QD solutions were characterized using UV-visible and fluorescence spectroscopies. The hydrodynamic radius of the QDs was determined using 2D NMR techniques. From the NMR experiments, the diffusion coefficient of the nanoparticles, in concert with a small reference molecule (ferrocene), was determined. Subsequently, the size of the nanoparticles was calculated using a modified version of the Stokes-Einstein equation. In another part of this project, the surface of QDs were modified with redox-active molecules. The electrochemistry of these modified nanoparticles was examined. This work is funded, in part, by the National Science Foundation (CHE-1126231).

The effects of respiratory chain inhibition on ATP production in human derived cells grown in different carbohydrate sources
Luis Tinoco
Department of The University of the South, Sewanee, TN and Department of Pharmacology Vanderbilt University, Nashville, TN
Faculty Sponsor/Mentor: Christine Konradi PhD.

Previous studies in the brain of bipolar patients demonstrated mitochondrial malfunctions. (BLCLs) can be readily obtained from a large number of patients. In order to assess mitochondrial malfunction in BLCLs in bipolar disorder patients, a method to force BLCLs into mitochondrial respiration needs to be devised. It is hypothesized that BLCLs grown in galactose media will cause BLCLs to use
mitochondrial respiration for ATP production. Rotenone, a complex I inhibitor of the electron transport chain, was used. BLCLs were treated for 24 hr. with 25 nM Rotenone. It was observed that ATP production in BLCLs grown in galactose was impaired under rotenone. To further analyze the metabolic pathway of BLCLs, Menadione was added to BLCLs to stress. BLCLs were exposed to different doses of Menadione (0.5 μM, 2.5 μM, 25 μM and 250 μM) for 20 minutes. BLCLs under 250 μM Menadione produced significantly lower amounts of ATP. Overall, under mitochondrial stress ATP production was lower in galactose-grown BLCLs.

**ABSTRACT 22**

**Comparison of stream water quality within and outside of the Sewanee Utility District**

Sally Warm and Chris Yeatman

Department of Natural Resources (forestry and geology)

Faculty Sponsor/Mentor: Scott Torreano

The Sewanee Utility District (SUD) is a local water treatment facility located on top of the Cumberland Plateau in Sewanee, Tennessee. This facility utilizes forest application and forest vegetation to filter its wastewater. This water is sprayed from facultative lagoons onto forested SUD property after chlorination. Our project examined water quality of three streams both above and below the spray fields, quantifying water temperature, pH, suspended solids, and concentration of nitrate, phosphate, chloride, and sulfate ions. We measured for these same water quality indices in a stream typical of the area located outside of the SUD as a control. Based on our preliminary data, it appears that there will be a significant increase in nitrate ions, TDS and TSS in the SUD streams. This is heightened during storm events. We hypothesize that the nutrient export will be significantly increased by sediment loads. We were unable to test this due to time constraints.

**ABSTRACT 23**

**Long-term land use and soil legacies on the Domain**

Brooks Allman, Chris Holcomb, John Ward

Department of Forestry and Geology

Faculty Sponsor/Mentor: Ken Smith

In the southern Appalachians, long-term human habitation is known to create significant changes in soil chemical and physical properties. On the Domain, several long-abandoned home sites provide an excellent location to study human influence on soils. In this study, we focused on one site in Compartment 40 that was abandoned approximately 50 years ago. Preliminary results indicate “hot-spots” of heavy metals and other soil elements around the old house. In addition, an inventory of tree species on the site revealed an unusual mix of hardwoods including black walnut (Juglans nigra), persimmon (Diospyros virginiana) and hackberry (Celtis occidentalis).

**ABSTRACT 24**

**VARIATION IN BREAKOUT MECHANISMS IN EXPERIMENTAL PAHOEHOE FLOWS**

Kelsa Warner

Department of Geology

Faculty Sponsor/Mentor: Bran Potter

It is difficult to constrain the variables that affect the final morphology of a pahoehoe lava flow. A primary control on flow direction and shape is the location and magnitude of breakouts. In this study, large-scale (~90-kg) lava pours were conducted in collaboration with the Keck Geology Consortium and the Syracuse University Lava Project. Breakouts were examined in experimental pahoehoe flows to define the mechanisms by which they occur and to attempt to predict breakout sites using knowledge of substrate slope and microtopography. Two experiments were analyzed in which molten basalt was poured onto a sloping (10 and 15 degrees) sandy substrate designed with regular microtopography. The study demonstrated that both slope and microtopography affect the formation of breakouts, and that breakouts in pahoehoe flows can occur by at least two separate mechanisms including a) inflation and crustal uplift and b) exploitation of crustal weaknesses that may preferentially lead to breakouts.
ABSTRACT 25

**Plerocercoid Infection of the American Alligator Phallic Sulcus**

Gosife Donald Okoye, Maria Granello, Amiel Emerson, David Spears

Department of Biology

Faculty Sponsor/Mentor: Brandon Moore

Crocodilians use an evertable phallus to transfer sperm to female reproductive tracts for internal fertilization. The semen is passed down a groove on the ventral surface of the copulatory organ. This groove, or sulcus, is lined with a secretory mucosal epithelium. Examination of histological samples from wild-caught Louisiana alligator revealed a tapeworm larval form, a plerocercoid, in the sulcus affixed to the mucosal epithelium. Pseudophyllidean tapeworm infection (sparganosus) is usually located at mucosal membranes such as the eye or intestinal wall. Infections of the reproductive tract other than a few cases of scrotum infection in humans have been reported. Here we investigate the anatomy of the parasite and its association with the alligator sulcus epithelium using histological images and three-dimensional reconstruction. We discuss potential impact on the underlying tissue and the ultimately reproductive fitness of the infected animal.

ABSTRACT 26

**Integrating the art of language translation and biological science: Anatomical Characteristics of the Male Genital Tract of the Caiman crocodilus crocodilus**

Amiel Emerson

Department of Spanish and Biology

Faculty Sponsor/Mentor: Ruth Sanchez and Brandon Moore

English is the most common language used to report scientific findings; however, many regional journals publish manuscripts in the local language. Precise English translations of non-English manuscripts are needed in order for English-speaking researchers to incorporate the manuscripts results into future experimental studies. Ongoing research in the Moore lab is focused on crocodilians reproductive structures. Therefore, we have translated from Spanish to English “Características Anatómicas del Aparato Genital Masculino del Caiman crocodilus crocodilus” by Francisco Cabrera and Gisela Garcia’s from the Universidad Central de Venezuela. Here we present a detailed summary of the manuscripts findings as well as a discussion of the process and challenges of translating this manuscript. Finally, we discuss what was learned from integrating two disciplines of study as well as further understanding the art of translation.

ABSTRACT 27

**Pathology of Pansteatitis in the Gonads of South African Tilapia**

Robert Corey

Department of Biology

Faculty Sponsor/Mentor: Thea Edwards

Pansteatitis, or yellow fat disease, affects tilapia, catfish, and crocodiles in Kruger National Park, South Africa. Diseased species exhibit necrotic or inflamed fat cells with accumulations of ceroid and lipo-pigments, melanin, iron, and macrophage immune cells. Pansteatitis is lethal but the cause is unknown, although studies suggest that a diet high in polyunsaturated or rancid fats along with vitamin E deficiency is one possible cause. Additionally, aquatic pollution may generate conditions of oxidative stress that directly cause pansteatitis or lead to fish mortality, creating a surplus of rancid prey. Because fat tissue produces hormones and stores calories for reproduction, we will use histological techniques to investigate the effect of pansteatitis on gonad development and function in adult tilapia caught in Kruger. This project helps identify causes and consequences of pansteatitis in tilapia, with relevance to others affected.
**ABSTRACT 28**

**The Effects of Error Management Training (EMT) on Critical Thinking**

Britta Carlson, Nathan Warren  
*Department of Psychology*  
*Faculty Sponsor/Mentor: Timothy Jesurun*

This research project looks at the effectiveness of error management training (EMT) on critical thinking skills. EMT is a technique that explicitly encourages learners to make errors under the assumption that students learn better from their mistakes. Students were placed in one of four different training conditions and their mean scores on an argument evaluation test were compared. Students were in one of four groups depending on whether they read or wrote about logical arguments and whether they were exposed to successes or mistakes beforehand. We used argument evaluation as a narrow measurement of critical thinking and we hypothesized that students in the active error condition would learn the most. We also surveyed individual differences to determine what types of people were most affected by the different training procedures, with tests of IQ, stress reactivity, and conscientiousness. Implications for critical thinking training in the college student population are investigated.

**ABSTRACT 29**

**Biological Survey of Bat Cave**

Pierce McGrady  
*Department of Biology*  
*Faculty Sponsor/Mentor: Kirk Zigler*

Tennessee has more caves and cave animals than any other state in the country. Even so, there are many parts of the state where cave biodiversity is poorly known. To address one regional gap in knowledge we conducted a biological survey of Bat Cave, Lincoln County, Tennessee. Bat Cave is the largest cave in Lincoln County. Only two cave obligate animals have been reported from Lincoln County. We conducted a total of four visits to the cave. Across two transects we conducted visual surveys and placed baits to attract animals. We observed a variety of cave-obligate species and non-cave obligate species. We report on the observed cave biodiversity and help to fill in a gap in the knowledge of cave biodiversity in central Tennessee.

**ABSTRACT 30**

**Thrive 2055 Natural Treasures Initiative Project**

Seminar in Environmental Studies, Beatrice Troxel, Elise Harrigan, Mallory Grimm, Catherine Hargrove, Allie Horick, Nicki Hubbard, Jamie Sue Wilson, John Black, Sara McIntosh, Monique Stitts, Laura Murray, Pierce McGrady, Sara Best, Sarah Bailey  
*Department of Environmental Studies*  
*Faculty Sponsor/Mentor: Daniel Carter*

As an aid to the Thrive 2055 initiative, this project focuses on four areas in need of conservation in the Chattanooga area. We report on the Conasauga River Watershed, the Cumberland Plateau and Cumberland Park, Eco-Tourism of the Chattanooga area, and Outdoor Recreation of the Chattanooga area. Interviews were conducted with personnel related to each area to gain an understanding of the current condition each area is in, as well as what measures need to be taken in order to properly conserve these initiatives. Our goal is to tell the story of these places through interviews and photographs so that the cultural, biological, and recreational assets of each region will be better understood. We aim to focus on why each resource is so important and what kinds of change people want to see in the next 40 years.
Respiratory Syncytial Virus Matrix Protein Mediates Filament Formation During Virion Assembly
Abby Bray (V-SURE), Jennifer Pickens, James E. Crowe
Department of Biochemistry and Vanderbilt-Sewanee Undergraduate Research Experience (V-SURE)
Faculty Sponsor/Mentor: Alyssa Summers

Respiratory syncytial virus (RSV) is the primary cause of viral lower respiratory tract infections in children. The RSV matrix (M) and fusion (F) proteins are viral proteins known to play a role in the assembly and fusion of the virus within host cells, but it is unclear exactly how these proteins interact. We hypothesize that RSV M interacts with RSV F cytoplasmic tail (F CT) and this is critical for virion assembly. Using site-directed mutagenesis, we generated 25 RSV M protein mutants to assess changes in filament formation using confocal microscopy or viral protein interactions by ELISA. We identified residues within a putative F CT binding pocket of RSV M that alter filament formation. Our data suggests that the observed changes in filament formation could be due to loss of binding between RSV M mutants and the F CT. These data give insight into how RSV M mediates virion assembly within epithelial cells and provide a potential target for development of antiviral therapeutics.

GABA Mediated Regeneration in Zebrafish Retina
Elizabeth Beilharz (V-SURE), Mahesh Rao, James G. Patton
Department of Biology
Faculty Sponsor/Mentor: Alyssa Summers

Retinal diseases are extremely common and can lead to partial or total blindness. Unlike mammals, Zebrafish are able to fully regenerate their retina. The Zebrafish retina closely resembles the human retina, providing an excellent model to study regeneration and a platform for new therapies. Zebrafish retina regeneration starts with Müller Glia (MG) proliferation; however, the initiating signal for MG proliferation is unclear. We propose an initial response following photoreceptor death is a decrease in GABA released by GABAergic Horizontal cells, which is sensed by the MG. Ocular injections of GABA-receptor inhibitors show spontaneous MG proliferation, while those of GABA-receptor activators show a decrease in MG proliferation. Genetic tests using a dominant negative γ2 subunit of the GABAA receptor confirmed MG specificity to GABA signaling. These tests show a direct sensitivity of MG to changes in GABA signaling, which acts as an initiating signal for MG proliferation after damage.

Alleghanian Deformation in the Raccoon Mountain Formation Immediately Downstream from Sycamore Falls in Fiery Gizzard
Ethan Burns, William Jenkins, Elizabeth Nugent, John Myer
Department of Geology
Faculty Sponsor/Mentor: Bran Potter

Fiery Gizzard, located on the Cumberland Plateau near Tracy City, offers rare bluff exposures of the Pennsylvanian-aged Raccoon Mountain Formation (interbedded sandstones, mudstones, and bituminous coal). A previously unmapped cliff immediately downstream from Sycamore Falls shows 10+ meter-scale folds and faulting that support previous work documenting a northwest tectonic transport during the Alleghanian orogeny. Locally, this strain is evident in a lens-shaped, fault-bounded, block and in highly sheared coal zones that core, northeast (N31E) trending folds in the more competent sand and mudstone layers above. These folds are asymmetrical with shallow southeast limbs (10-20°) and steeply dipping to overturned northwest limbs. The deformation coincides with two décollement zones previously described above Sycamore Falls thought to intersect the Sequatchie thrust 14km to the southeast. An annotated and detailed panoramic photograph allows analysis and synthesis of the entire outcrop.
Forest Restoration at Sewanee: Tracking Changes in the Canopy
FORS 262 Forest Restoration
Department of Forestry and Geology
Faculty Sponsor/Mentor: Ken Smith

Currently, ten sites are being managed with fire on the Domain. Three of these sites originally had a planted pine component and have been treated with thinning and prescribed fire over the past five years. Basal area was reduced from 20-50% across the three sites, and thinning resulted in decreases in the pine component of the overstory and the hardwood mid-story. Snag densities ranged from 48-121 per ha, and fuel loadings ranged from 13-18 tons per acre in 2015. Harvest technology seems to have affected fuel distribution and loading across the three sites.

Mate Guarding, Testosterone, and Fraternity Parties: A Test of the Challenge Hypothesis
Ansley McDurmon, Thea Edwards
Department of Biology
Faculty Sponsor/Mentor: Thea Edwards

Originally studied in birds, the Challenge Hypothesis posits that male-male competition increases testosterone (T) in reproductive males. In birds, elevated T increases mate fidelity by eliciting male mate-guarding behavior to fend off competitors, but can also increase risky behavior, such as unnecessary, violent aggression. Here, we propose testing the Challenge Hypothesis in single college-age men. We hypothesize that men will respond with elevated T when exposed to environments with high mate availability (and presumably competition), such as fraternity parties. We will measure T in saliva samples collected from 40 college-age men in two settings, using ELISA methods. The first setting, a quiet, unstressed study environment, is expected to elicit lower T values than a fraternity party setting. This study of links between salivary T and social setting could inform related studies of male violence, supporting risk-management efforts concerning the college party scene.

Mapping US Forest Service Research Plots on the Domain
J.R. McDonell, Wyatt Ponton, Weston Stitt
Department of Forestry and Geology
Faculty Sponsor/Mentor: Ken Smith

This project combines old US Forest Service documents with the ongoing Sewanee Forest History Project (SFHP) to create an interactive Geographic Information Systems (GIS) map that can be accessed by the public. Using GIS, we have rectified an old topographic map, which shows locations of US Forest Service research plots on the Domain, so it can be spatially recognized. We have created polygons on the GIS map for each plot that can be clicked on to access the Forest Service documents that describe the type of land management and research activities that occurred in that plot. Once field verified, these Forest Service documents will provide more detail into the purpose and outcome of each study.
ABSTRACT 37

Predicting the presence of carabid cave beetles
Adam McAnally
Department of Biology
Faculty Sponsor/Mentor: Kirk Zigler

Beetles of the family Carabidae, the ground beetles, are particularly important in nutrient cycling within cave ecosystems as predators of smaller invertebrates. One particular genus of cave-dwelling carabids, Pseudanophthalmus, constitute a relatively understudied group, six of which have been recently nominated as candidates for the endangered species list. Due to the limited knowledge base regarding cave carabids a GIS model was constructed in order to effect the evaluation of conservation status via targeted cave surveys. The model purports to predict the presence of the species in question based upon presence only data, habitat availability, and geospatial comparisons. The utility of this model informs future work to achieve a better understanding of cave carabid life cycles and population dynamics.

ABSTRACT 38

Comparison of toxicity and aggregation of ataxin-3 protein in muscle and neuronal cells of C. elegans
Nakeirah Christie, Hannah Fay, Amy Lee, Jordan Grant, Sheana Algama, Y-nhi Nguyen, Lester Paul Sands, Fridien Nana Tchoukoua
Department of Biology
Faculty Sponsor/Mentor: Elise Kikis

Machado Joseph Disease (MJD) is a neurodegenerative disorder caused by an expansion of CAG (polyQ) repeats within the gene that codes for the ataxin-3 protein. This expansion is correlated to protein aggregation and a toxic-gain of function, but understanding of the cellular mechanism has yet to be elucidated. Our lab utilizes the model organism C. elegans to investigate the toxicity and aggregation of the ataxin-3 protein. Specifically, we are interested in how cellular protein homeostasis (“proteostasis”) impacts aggregation and toxicity of the mutated protein; consequently, we are interested in how the protein functions in different tissues. To answer this question we characterized C. elegans expressing the C-terminal fragment of ataxin-3 with various polyQ tract lengths in either body wall muscle cells or neurons. After performing motility assays, fluorescence microscopy, and qRT-PCR of HSP genes, our preliminary data suggest that a) both cell lines demonstrate a direct relationship between length of polyQ expansion and severity of aggregation and toxicity and b) that only the aggregation and toxicity of the neuronal lines is age-dependent.

ABSTRACT 39

Synthesis of KP1019 and USO2, a neutral platinum derivative
Param Singh and Sydney Jackson
Department of Chemistry
Faculty Sponsor/Mentor: Robert Bachman

Many current pharmaceuticals are derived from natural products, however there has been recent interest in developing drugs with central metal atom as they have been found to be effective in treating many diseases. KP1019, a ruthenium-based drug that has shown cytotoxicity towards cancer cell lines with minimal side effects, yet little is known about KP1019’s mode of action in the body. We have undertaken the synthesis of a neutral platinum derivative, USO2, to gain insight on the structure-activity and mode of action of KP1019. The synthesis of USO2 can be carried using a method described for KP1019, replacing the source of Ru (III) with K$_2$PtCl$_6$, Pt (IV), dissolved in water or acid and indazole. We found that there were few variables to consider when running these reactions of which consisted of change in temperature and solvent concentration. Progress of this synthesis will be further investigated.

ABSTRACT 40

Selective Bromination of M(acac)$_3$ Complexes
Sara Parks, Maria Granello, Amelia Gray, Lauren Petrosh, and Palmer Coleman
Department of Chemistry
Faculty Sponsor/Mentor: Robert Bachman

Brominated metal acetylacetonate (M(acac)$_3$) complexes are potentially useful as reagents for Suzuki reactions. Monobrominated complexes could be directly linked to a single organic moiety, while dibrominated products could serve as a bridge between two organic
fragments. This project focuses on the synthesis of M(acac)$_3$ compounds and their selective bromination. Additional exploration of these brominated complexes in Suzuki and related palladium-mediated coupling will be investigated. Progress toward these goals will be discussed.

**ABSTRACT 41**

**The Physics behind LIDAR and Ceilometers**
Joel Stewart  
*Department of Physics*  
*Faculty Sponsor/Mentor: Randolph Peterson and Kevin Hiers*

Using a ceilometer to employ light detection and ranging, I have measured the backscatter of eye-safe electromagnetic waves off of the atmosphere. This data is used to determine the height of the bases of clouds their density and other atmospheric data, which are useful in understanding a number of events, which I will touch on. Nighttime inversions are particularly interesting, because an inversion can lead to pollution being trapped close to the ground. Inversions can also lead to violent thunderstorms. Temperature inversion can result in freezing rain in cold climates. I will be discussing the theoretical background, light detection and ranging, as well as my data taken at Sewanee and what it means.

**ABSTRACT 42**

**Creating and Analyzing Thin films in Sewanee**
Charlie Morrow  
*Department of Physics*  
*Faculty Sponsor/Mentor: Randolph Peterson and Eugenii Donev*

Thin films varying in composition and thickness have become useful in todays industries. Thin films are used in all fields of science and are found in everyday life in the form of bubbles or oil spills. I have created silver thin films using the new Mantis deposition system and gold thin films with an older Denton vacuum coating system. The thicknesses of several of the thin films were measured using Rutherford backscattering of 2.0 MeV He$^+$ ions and found to vary between 5-50 nm. An optical etalon with two partially reflecting mirrored surfaces were made with a coating of gold thin films. The wavelength of light was measured from the interference patterns seen when viewing a monochromatic light source through the etalons made in these experiments. Results from the various thin film experiments will be discussed.

**ABSTRACT 43**

**The effect of limestone road runoff on the spread of the invasive shrub, *Spirea japonica* (Japanese spirea)**
Caroline Holmes, Kipling Klimas, Maddie Taylor  
*Department of Biology*  
*Faculty Sponsor/Mentor: Jon Evans*

The invasive shrub *Spirea japonica* (Japanese spirea) has recently become established in plant communities of the Cumberland Plateau. Understanding the patterns of the distribution of this species could potentially help reduce the rate of invasion and the negative effects it may have on the native ecosystem. We used box transects to examine the distribution and abundance of *Spirea* as a function of 1) distance from road, 2) distance from stream and 3) soil pH. *Spirea* densities were highest nearest the road and closest to the stream. We found a significant positive relationship between *Spirea* density and elevated soil pH caused by runoff from a limestone gravel road. Our results suggest that high pH road runoff during storm events increases the invasibility of adjacent forests through concentrated movement of *Spirea* seeds and the creation of more favorable soil conditions for seedling establishment along stream banks.
Effect of limestone runoff on Breakfield Road stream

Willy Wright, Caroline Holmes

Department of Chemistry and Biology

Faculty Sponsor/Mentor: Emily White

Human disturbances, such as roads, degrade natural ecosystems. Degradation allows invasive species to colonize these disturbed areas. Fragmentation of forest by roads creates environments for non-native species to establish and become invasive when the plants out-compete native species. Japanese spiraea (Spiraea japonica) has established along Breakfield Road because of fragmentation. A nearby stream is negatively affected by runoff from the limestone gravel. Road runoff influences the stream resulting in J. spiraea colonization in the interior forest. pH, dissolved oxygen, temperature, and conductivity were measured at the Breakfield Road stream and a reference site. Water samples at each site were tested for nitrogen, phosphorus, hardness, alkalinity, and acidity. These results were used to investigate the effect of Breakfield Road’s limestone gravel on stream health and the ability of spiraea to colonize further into the forest interior.

Identifying organic contaminants of emerging concern in Sewanee’s facultative lagoons

Paul G Naumann, Oksana Creech, Eli Lavender, Emily Newton

Department of Chemistry

Faculty Sponsor/Mentor: Emily White

Many of the drugs we use have potentially hazardous effects on wildlife. Amphibians, reptiles, insects and other animals can suffer from endocrine or nervous system disruption from exposure to organic contaminants such as estrogen and nicotine. Traditional wastewater treatment plants are not designed to remove these contaminants. As a result, these types of contaminants end up in the environment and are therefore of emerging concern. Derivatives and metabolites of these compounds were measured in facultative lagoons A and C at the Sewanee Utility District facility. These contaminants have not been measured before at this facility. By using high performance liquid chromatography (C18 column) in conjunction with mass spectroscopy and UV Detection, the presence of these drugs was investigated. Various other water quality parameters that influence the metabolism of these drugs (e.g., pH, dissolved oxygen, and temperature) were measured.

Studying the effectiveness of Sewanee’s wastewater treatment process to remove nutrients

Jack M. Conrad, Daniel J. Myers, Kelley F. Myers

Department of Chemistry

Faculty Sponsor/Mentor: Emily White

The wastewater treatment process removes nutrients that could be harmful to the environment. Sewanee uses a typical treatment system for a small, rural community. Sewage is pumped into a lagoon where a combination of algae and bacteria digest the excess nutrients. Concentrations of nitrogen and phosphorus were determined spectrophotometrically from samples that had been subjected to varying degrees of treatment. Surface dissolved oxygen was measured, using an optical probe, to evaluate the role of biological processes in the removal of nutrients. Samples were collected from the sewage input and from lagoons A and C at the Sewanee Utility District treatment plant. General water quality parameters (e.g., pH, conductivity, temperature, turbidity, and bacterial counts) were also measured. These results were used to investigate the effectiveness of the treatment through the various stages.

Ligand Substitution on \([\text{M(acac)}_3] \) (M=Cr, Co) Compounds

Camille Le Gardeur de Tilly, Ella Dermon, William Wright, Daniel Myers

Department of Chemistry

Faculty Sponsor/Mentor: Robert Bachman

Chromium acetylacetonate can be used for solar energy, water treatment, catalysts, and catalytic reagents for organic synthesis of carbon nanostructures. Compounds of structure \([\text{M(acac)}_3] \) have similar reactivity. Experimentation can be useful in understanding
how and why a complex forms and can be applied to make new compounds. In this combined study, two procedures were used to cause an exchange between a bidentate (acac) and a new ligand. In Method A, phenanthroline or glutamic acid bidentate ligands replaced an acac ligand on the central metal ions of \([\text{Cr(acac)}_3]\) and \([\text{Co(acac)}_3]\) by photodissociation to give a yield of \([\text{Cr(phen)(acac)2]}\), \([\text{Co(phen)(acac)2]}\), \([\text{Cr(amac)(acac)2]}\) and \([\text{Co(amac)(acac)2]}\). In Method B, acidic conditions were used to perform ligand exchanges with 8-Quinolinol on both \([\text{Co(acac)}_3]\) and \([\text{Cr(acac)}_3]\) complexes. These ligand-exchanges were characterized by IR, NMR, and TLC and the results will be discussed.

**ABSTRACT 48**

**The Effects of Drought on Plant Productivity on Sewanee’s Domain (1997-2009)**

Sara Smith, Ben McKenzie  
*Department of Environmental Studies*  
*Faculty Sponsor/Mentor: Russell Fielding*

In recent years, extreme El Nino and La Nina weather patterns have led to severe droughts throughout the Southeast, and specifically on Sewanee’s domain. This is consistent with current climate models, which project more severe weather events as anthropogenic climate change progresses. Past studies have used GIS software to link abnormally severe droughts to decreases in ecosystem net primary productivity. Our study uses an ArcGIS based NDVI operating on LANDSAT imagery to show changes in plant productivity on Sewanee’s Domain for the years 1997-2009. We divide the Domain into compartments and used weighted averaging of NDVI by habitat type to compare results. We hypothesize that the year immediately following drought would show a decrease in plant productivity. Furthermore, we expect the effects of drought will be the most pronounced and long-lasting atop the plateau and within South-facing cove communities as compared to North-facing cove communities.

**ABSTRACT 49**

**Using optical brighteners and fecal indicator bacteria to monitor Sewanee’s wastewater treatment**

Tia Strickland, Param Singh, Walker Ueland  
*Department of Chemistry*  
*Faculty Sponsor/Mentor: Emily White*

Optical brighteners (OB) or fluorescent whitening agents are organic dyes added to laundry soaps, detergents and cleaning agents to brighten fabrics and surfaces. These brighteners possess distinct fluorescent characteristics that can be used to detect sewage leaks in environmental waters. Optical brighteners absorb light in the ultraviolet wavelength range (360 to 365 nm) and emit light in the blue range (400 to 440 nm). Spectrofluorometry was used to determine the relative amount of OB present in wastewater at the Sewanee Utility District sewage treatment site, OB, total coliforms, *E. coli*, and turbidity were analyzed in samples collected from the facultative lagoons and from land-applied effluent. Fecal indicator bacteria counts (measured using an enzyme substrate test) were used along with OB fluorescence to evaluate the effectiveness of the treatment process and the extent of contamination in the stream receiving runoff from the spray fields.

**ABSTRACT 50**

**Using UV-vis spectroscopy to evaluate interactions between KP1019 and nitrogenous bases**

Hallie Crosby and Tia Strickland  
*Department of Chemistry*  
*Faculty Sponsor/Mentor: Robert Bachman*

The ruthenium based anti-cancer drug, trans-[tetrachlorobis(1H indazole)ruthenate(III)], otherwise known as KP1019, is currently in phase II clinical trials. It is designed to mimic Cisplatin, for targeting DNA, halting protein synthesis and resulting in cell death, and has a reduced toxicity and versatility as a function of the variable oxidation states. Current studies have focused on screening for damage caused to DNA, but its precise mechanism of action remains poorly understood due to short-lived interactions. In a phosphate buffer solution (pH 7.2), an UV-Vis probe was used to monitor minute interactions between KP1019 and nitrogenous bases at a 1:4 ratio. The kinetics of the interaction were then evaluated more closely.
Predicting Mentalizing Abilities in Adolescents with N170 Amplitude and Latency

Hallie Crosby

Department of Yale Child Study Center: Developmental Electrophysiology Laboratory
Faculty Sponsor/Mentor: Helena Rutherford and Linda Mayes

Mentalization is the process of interpreting mental states of others and is the determinant of actions. Emotions can be inferred from facial expression, voices, and whole-body movements, while eye gaze direction and body movements can be used to read desires and intentions. Children with ASD have been found to lack the metalizing abilities normally seen in children, and has been partially attributed to them focusing their attention on the mouth rather than the eyes of others. The N170 is an ERP component that distinguishes faces from objects. Negative and neutral male and female faces were used to generate N170 ERP data, and the significance of emotion, gender, and hemisphere on the data was investigated. Participants also completed the RMET. Their RMET accuracy scores were then correlated to their N170 amplitude and latency data generated from the faces. We investigated the possibility of the N170 data being able to predict how the participant would score on the RMET.

Monitoring wastewater treatment by a rural facultative lagoon system

Leslie Leiva, Veronica Gordillo-Herrejon and Ava Conner

Department of Environmental Chemistry
Faculty Sponsor/Mentor: Emily White

Effective and cost-efficient wastewater treatment is critical for ensuring the availability of clean water. A simple facultative lagoon system is used to treat wastewater in Sewanee. A pilot study is being planned to investigate the effectiveness of constructed wetlands to treat wastewater at this site. Standard methods were employed to establish baseline water quality at various stages of the treatment process. Measured parameters include conductivity, temperature, pH, turbidity, total suspended solids, dissolved oxygen, biological oxygen demand, nitrogen, phosphorus, total coliforms, and E. coli. Samples were collected from the facultative lagoons, chlorination tank, and streams that cross the forested land in which the final treated effluent is sprayed. Preliminary results demonstrate the importance of routine monitoring in understanding the treatment processes that occur in facultative lagoons.

Staple Commodities and the World Press Freedom Index

Paul Ricks

Department of Mathematics and Computer Science
Faculty Sponsor/Mentor: Linda Lankewicz

The purpose of this research is to attempt to find a link between a basic economic force, agricultural commodities, and the World Press Freedom Index, an explicit policy choice. The research analyzes commodities data and uses ratios as predictors for models for individual countries. Before the models are created, feature selection is employed to limit the number of predictors used in the models, to avoid over fitting. By comparing the success of the models the hope is that a pattern based on the strength of the link between the commodities data and the index can be determined.

Women in Positions of Leadership Within the Sewanee Community

Allegra Campbell

Department of Politics
Faculty Sponsor/Mentor: Melodie Crowder-Meyer

I hypothesize that in a small close-knit environment like Sewanee there is a high level of women in positions of leadership compared to the nation trend in both student and academic organizations due to the confined population size, lack of fundraising required in order to run, and the relatively low level of campaigning necessary in order to be viewed as a viable candidate. Compared to levels
of women in positions of leadership across the political spectrum, my data reveals that women in Sewanee are far more engaged in campus activities and within the student body, in part due to the lack of circumstances that hinder women later on in their lives. I believe that these positive statistics are a reflection of a growing trend that demonstrates that women are just as likely, if not more likely, to hold positions of leadership when they do not have to factor in many of the obstacles that prevent women from running for office such as choosing between a career and family.

ABSTRACT 55

Presence and removal of pharmaceuticals in a rural wastewater treatment plant
Dannielle Hendon
Department of Chemistry
Faculty Sponsor/Mentor: Emily White

Pharmaceuticals and personal care products (PPCPs) are contaminants of emerging concern in environmental waters that receive wastewater effluent. Little is known about the removal of these compounds by treatment systems in small rural communities. In Sewanee, wastewater treatment consists of a series of facultative lagoons followed by chlorination and forested land application. To investigate the fate of PPCPs during treatment, six contaminants (acetaminophen, caffeine, trimethoprim, sulfamethoxazole, erythromycin, and carbamazepine) were analyzed by high performance liquid chromatography-mass spectrometry (HPLC-MS) after solid phase extraction. Samples were collected in July 2014 from two treatment lagoons and two run-off streams, which egress the sprayfields. Results show that PPCP concentrations decreased during treatment. Concentrations were approximately 80, 70, and 50% lower in the second lagoon, compared to the first lagoon, suggesting high removal efficiency.

ABSTRACT 56

H.O. Todd Egg Collection Project
Jamie Sue Wilson
Department of Biology
Faculty Sponsor/Mentor: Kirk Zigler and David Haskell

Henry Oliver Todd was an ornithologist based out of Winchester, TN that collected bird eggs during the early 20th century. When he passed, he left his egg collection to The University of the South to be used for educational purposes. The collection sits in Woods Lab and is rarely used. To increase knowledge of this collection, I photographed the eggs and will create an online database where researchers and ornithologists will have access to this aging collection. On each egg is the American Ornithologists’ Union species number, the clutch number, the year, and the number of eggs in that clutch. I photographed the eggs by clutch and posted them to a website designated for the collection. I also kept track of how many eggs and what species are included in the collection. The collection contains over 2,100 individual eggs, over 560 clutches, and over 190 species of birds. This project is important for the further understanding of avian ecology and reproduction in a historical setting.

ABSTRACT 57

A Comparison of Two Villages in the Central Plateau Region of Haiti
Elizabeth Sega, Ben McKenzie, Duncan Pearce, Scott Summers, Geanina Fripp, Linnea Carver, Ford Rushton, Keri Bryan, Charlotte Henderson
Department of Biology
Faculty Sponsor/Mentor: Deborah McGrath

The mission of Zanmi Kafe (Partners in Coffee) is to provide Haitian farmers with a sustainable alternative to slash-and-burn agriculture by providing them with the resources to begin their own small shade-grown coffee operations. Zanmi Kafe began in 2013 with the establishment of a 16,000-seedling nursery comprised of coffee, mangos, and other native tree seedlings in the mountain village of Bois Jolie on the Central Plateau of Haiti. In 2014 another nursery was established in the village of Blanchard, situated on the region’s main highway, less than five miles from Bois Jolie. Despite their close proximity, these two villages are very different communities, indelibly marked by their respective identities as a rural mountain village, and a village on the side of a major highway. This poster details differences in land use, land ownership, soil composition, and livestock and production strategies, and how these differences may affect the mission of Zanmi Lasante in these communities.
ABSTRACT 58

Reverse-Switching Effect in Extraordinary Optical Transmission
Abigail Brudvig
Department of Physics
Faculty Sponsor/Mentor: Eugenii Donev

When shining light on arrays of nano-scale holes, we see some interesting optical effects. Extraordinary optical transmission (EOT) is when more light gets through than we would predict with classical diffraction theory. Vanadium dioxide gives unexpected results when it is used as a component of one of these arrays. We find that it has more enhanced transmission when it is in its conducting phase than its insulating phase. This reverse-switching effects is explored with finite-difference time domain (FDTD) simulations.

ABSTRACT 59

Colorimetric determination of total phosphorus in wastewater
Lauren M. Petrosh
Department of Chemistry
Faculty Sponsor/Mentor: Emily White

Phosphorus is a common constituent of sewage. While it is of little concern to human health, phosphorus present in wastewater effluent can contribute to the eutrophication of receiving waters. Phosphorus removal is therefore a key component of the wastewater treatment process. In order to evaluate the efficiency of a treatment system, water quality monitoring is essential. Total phosphorus was quantified colorimetrically as phosphate by the ascorbic acid method, following digestion by persulfate. Given the complexity of the wastewater matrix, controls, spikes, and standard additions were used to ensure accuracy and precision of the method. Samples were collected from two different lagoon sites, Lagoon A and Lagoon C at the Sewanee Utility District (SUD) wastewater treatment facility. Results were evaluated in order to determine the role of the wastewater matrix of the two lagoons as well as the efficacy of the method.

ABSTRACT 60

The Role of Hdacs on Mammary Tumorigenesis
Sydney Philpott, Angelica De Freitas
Department of Biology
Faculty Sponsor/Mentor: Alyssa Summers

Histone deacetylases (HDACs) are enzymes that epigenetically modify nucleosomes and repress transcription of histones and nonhistone proteins by remodeling DNA from euchromatin to heterochromatin. Understanding the diverse functions of HDACs has lead to an in depth study of the relationship between HDACs and cancer. Since the increased deacetylation of histones leads to increased cell proliferation, angiogenesis and invasion, the use of HDAC inhibitors (HDACi) may be a new therapeutic strategy. HDACi promote cell cycle arrest, apoptosis and cell differentiation, while preventing angiogenesis. Summers lab has previously shown a decrease in cell viability, proliferation, and motility with the use of HDACi. Recent investigations are directed towards elucidating the mechanism by which misregulation of HDACs promotes invasion. Currently, we are investigating the role of HDACi on nonhistone target Hsp90 and its subsequent effect on the Her2 signaling pathway in mammary tumorigenesis.

ABSTRACT 61

Experimental Evidence for Single Surface Layer of Bismuth in a Dilute Alloy of Bismuth with Gallium
Daniel Rosales Giron, Taylor Morris, Charles Morrow, Joel Stewart
Department of Physics
Faculty Sponsor/Mentor: Randolph Peterson

Dilute concentrations of bismuth in gallium are thought to have a surface layer of Bi that is one atom thick. We have observed Rutherford Backscattering of 2.0 MeV helium ions from the surface of a dilute Bi in Ga alloy, and have observed RBS spectra that are consistent with a thin surface layer of Bi. We also observed a repeatable, dynamic change in the surface layer with ion beam dose. Experimental calibrations and results will be presented.
**ABSTRACT 62**

**Comparison of extraordinary optical transmission through metallo-dielectric materials and silver thin films**

Daniel Rosales  
*Department of Physics*  
*Faculty Sponsor/Mentor: Eugenii Donev*

Metallo-dielectric films interposed with silver thin films show extraordinary optical transmission, very much like those of a silver thin film of equivalent thickness. Although the intensity of the transmission is several order of magnitudes different, the relative intensities and position of the enhanced transmission is unchanged between these two cases. This suggests that the surface plasmons created on both the meta-material and the Ag produce results with negligible differences. We applied this to two scenarios in which the surface plasmons would be better identified: the thin film in it’s own, and the thin film with a hole. Analysis is still ongoing.

**ABSTRACT 63**

**Zanmi Kafe: Confronting Poverty, Deforestation, and Climate Change through Coffee-Based Agroforestry Systems in Bois Jolie, Haiti**

Duncan Pearce, Geanina Fripp, Scott Summers, Elizabeth Sega, Wupey Bosquet, Maxo Noel  
*Department of Biology*  
*Faculty Sponsor/Mentor: Deborah McGrath*

Zanmi Kafe (Partners in Coffee) began in 2013 through the establishment of a 16,000-seedling nursery comprised of coffee and other native multi-purpose tree seedlings in Bois Jolie, Haiti. This nursery has provided 40 farmers with income-generating trees intended to encourage the establishment of more ecologically sustainable agroecosystems that will improve the livelihood of these Haitian families. In March 2015, spring break outreach participants measured the survival rates of every seedling distributed in the summer of 2014. With these data, we can treat diseased coffee plants using integrated pest management, while also providing farmers with a payment for ecosystem services (PES) for carbon sequestration that will encourage the protection of these seedlings. This research will allow us to document social, economic, and environmental changes that result from shade-grown coffee agroforests, while also allowing Sewanee students the opportunity to reduce their carbon footprint.

**ABSTRACT 64**

**Woodland Restoration on the Domain**

Rebecca Gorodetzky, Landon Manning, Benjamin Sadler  
*Department of Biology*  
*Faculty Sponsor/Mentor: Jon Evans*

Woodlands communities are characterized by a tree canopy ranging from 30%-80% closure with a sparse under- or midstory and dense ground flora rich in forbs, grasses, and sedges. Woodland conditions can be found on the Domain along areas of dry, shallow soil such as along ridges or around sandstone outcrops. In 2013 the ConservationBiology class removed white pine (Pinus strobus), a species not native to the Domain, that had invaded a ridge community on the Domain that was believed to have previously had woodland conditions. White pine had dominated the midstory and grasses were not present. We followed up on this study by resampling plots established in 2013 to test the hypothesis that the removal of the pine would allow for the establishment of an understory herbaceous community. We found that while white pine had not reinvaded, there was limited establishment of new ground cover by herbs and sedges (>10%). In the future the use of controlled burnings may further promote restoration.
Transcriptional Regulation of GIMAP Proteins
David Pride, Sarah Christie
Department of Biology
Faculty Sponsor/Mentor: Alyssa Summers

GTPase of immunity-associated proteins, GIMAPs, represent a family of GTP-binding proteins whose expression is highly regulated within T-cells during development and differentiation and implicated in the onset of T-lymphopenia, leukemia, and autoimmunity. Histone deacetylase inhibitors (HDI) have been shown to decrease proliferation and have cytotoxic effects in T-cell lymphomas. To investigate the role that epigenetic modification has in GIMAP gene regulation, we analyzed, using chromatin immunoprecipitation, the effects of clinically-tested HDAC inhibitors: Belinostat, Vorinostat, and RGFP-966 on acetylation of histones within specific regions of the GIMAP 4 and 7 proximal promoter regions. Data indicate a direct correlation of dose-dependent promoter activation with increasing HDI concentration. Possible protein binding sites found by bioinformatic analysis of the promoter regions correspond to the observed regions of euchromatin, indicating higher transcriptional activity.

Coarse Woody Debris Project
Gabrielle Fignar, Zack Loehle, Carolina Flagler, Jamie Sue Wilson
Department of Biology
Faculty Sponsor/Mentor: Jon Evans

Coarse woody debris (CWD) is essential for the maintenance of native forest biodiversity on the Cumberland Plateau and is an important component of carbon sequestration. Forest management practices affect the quality and quantity of CWD. A previous class study (2013) set a baseline of CWD data for four areas on the Domain. Areas were categorized by: 1) time since last timber harvest (old and young) and 2) historic frequency of timber harvest (frequently and occasionally). Using 1000 sq m. transects, we measured CWD and determined diameter distributions of live trees. Our results confirmed our hypothesis that there was a greater quality and quantity of CWD in the old, occasionally harvested area. In comparison to 2013, all areas had fewer standing dead trees and a greater abundance of fallen CWD. We believe this change in CMD distribution reflected a pulse of tree mortality that occurred in the forest after the drought of 2007.

Zanmi Foto: Gaining Perspective and Building Connections in Rural Haiti
Brooke Irvine, Chandler Sowden, Caroline Minchew, Pradip Malde and Paul Verel Brianvil, Thony Fontaine, Monclair Joseph, Aloce Louis (students at Centre de Formations de Fritz Lafontant).
Department of Art and Art History
Faculty Sponsor/Mentor: Pradip Malde

Zanmi Foto (Partners in Photography) is a photography and community development project begun in the summer of 2013. The project aims to strengthen Haitian communities, while compiling visual data for tandem projects such as Zanmi Kafe. ZF provided cameras and training in photography and discussion facilitation to agricultural students at a vocational school in Haiti. The young agronomists work alongside Haitian farmers to document life in rural Haiti. Sewanee students and faculty returned in the summer of 2014 to conduct further workshops with the students and farmers. With Sewanee students and faculty serving as advisors, the agronomists continue to collect photographs and stories describing the state of economic and social connections throughout the year. The project will help rural Haitians to connect with their communities, actively partner in future efforts to intervene in cycles of poverty and marginalization, and ultimately become more resilient to future challenges.
Effects of Early Adolescent Methamphetamine and Nicotine Exposure on Behavior and Cognition in Adolescent Mice
Jordan Buck, Alyssse Schultheis, Jessica Siegel
Department of Psychology
Faculty Sponsor/Mentor: Jessica Siegel

The rising rates of adolescent methamphetamine (MA) use necessitate that we understand the effects of MA exposure on the brain. Adolescent MA users show high rates of nicotine (NIC) use and NIC can mediate the effects of MA. Adolescent male C57BL/6J mice were administered meth, nicotine, meth and nicotine, or saline over 2 days. Mice were tested in the open field test, novel object recognition test, Porsolt forced swim test, Morris water maze, and MA-induced conditioned place preference to evaluate locomotor and anxiety-like behavior, object memory, depression-like behavior, spatial memory, and MA craving, respectively. The mice administered MA or NIC spent more time in the center of the open field, indicating increased risk taking compared to the other groups. There was a trend for decreased corticosterone in MA-exposed mice compared to saline-exposed mice. These results contribute to a greater understanding of how concurrent MA and NIC exposure affects an understudied age group.

HDAC-Mediated Transcriptional Control of GIMAP Genes
Jordan Buck, Jacob Zalewski, Amiel Emerson
Department of Molecular and Cellular Biology
Faculty Sponsor/Mentor: Alyssa Summers

HDAC expression/activity is increased in cancer, and GIMAPs exhibit aberrant function/expression in T-cell lymphomas/leukemias. Given the increasingly common use of HDAC inhibitors (HDIs) to augment various cancer treatments, understanding the effects of HDAC levels/activity on GIMAP expression is crucial to developing/improving such treatments. Thus, we analyzed the relationship between HDAC3 and GIMAP 4/7 in human lymphoma cells treated with HDIs and HDAC-KO mouse thymocytes. Data from qRT-PCR and luciferase assays revealed significant effects of both HDI treatment and HDAC3 up-regulation on GIMAP 4/7 expression and promoter activity, and HDI treatment attenuated T-lymphocyte proliferation/survival. Our findings implicate HDAC3 in the transcriptional control of GIMAP expression and suggest a novel locus for the therapeutic effects of HDIs.

Cognitive Abnormalities in Obsessive Compulsion Disorder
Emerson Simey
Department of Psychiatry, OCD Research Clinic, Yale University, New Haven, CT
Faculty Sponsor/Mentor: Patricia Gruner

Obsessive compulsive disorder (OCD) is associated with cognitive inflexibility. In this study, our long-term goal is to improve OCD by ameliorating cognitive inflexibility, through specific mental exercises - cognitive remediation. A critical first step towards this goal is to investigate the nature of the cognitive inflexibility seen in OCD patients. To do so, we administered cognitive tasks to OCD patients and controls with a computerized battery.

Verifying the Second Law of Thermodynamics
Michael O'Neil
Department of Physics
Faculty Sponsor/Mentor: Randolph Peterson

The second law of thermodynamics states that in a closed system, entropy will increase. Using a thermoelectric device as a Seebeck-effect heat engine and a Peltier-effect heat pump, I will measure the responses as a function of temperature. When these responses are compared with the second law of thermodynamics, there should be good agreement.
**ABSTRACT 72**

**Spatial and Temporal Drivers of Spotted Salamander Migrations**

Lindsey Liles, Jaina Gandhi, Kristen Cecala  
*Department of Biology*  
*Faculty Sponsor/Mentor: Kristen Cecala*

Amphibians are biphasic, and require high quality aquatic and terrestrial habitat for breeding migrations. Increasing urbanization including road construction threatens the connectivity between these two habitats. We studied the directionality of *Ambystoma maculatum* movement in and out of an ephemeral wetland during the breeding season migration in order to explore the effect of an infrequently used road on movement. We installed a drift fence around the wetland and marked all captured individuals entering and leaving during a forty day period. We found that infrequently used roads did not disconnect upland and aquatic habitat, but that they may alter or funnel movement pathways. We also analyzed movement in relation to weather patterns, and found that rainfall was a significant predictor of movement events, and that nighttime low temperatures are the most important indicator of spotted salamander migrations. Future studies should explore how spotted salamanders and other amphibian species navigate roads and whether construction materials like gravel versus pavement alter these navigations.

**ABSTRACT 73**

**Interactive Effects of Temperature and Glyphosate on Stream Salamander Anti-predator Behavior**

Jaina Gandhi, Kristen Cecala  
*Department of Biology*  
*Faculty Sponsor/Mentor: Kristen Cecala*

Land-use change has been implicated as the primary driver of amphibian declines. Herbicide runoff and riparian clearing are two potential stressors for stream organisms. Both these aspects of agriculture are known to impact amphibian survival and success. Our objective was to assess the impact of low concentrations of a widely-used herbicide (glyphosate) and water temperature on a wide-spread larval stream salamander using behaviors known to alter survival such as predator avoidance and movement frequency and speed. Both temperature and glyphosate concentrations changed amphibian movement behaviors but not predator avoidance. Temperature negatively influenced movement frequency, and glyphosate concentration was negatively correlated with escape distance. We conclude that glyphosate has larger impacts at warmer temperatures and recommend that practitioners avoid applying glyphosate to fields with deforested riparian zones.

**ABSTRACT 74**

**Effects of Road Salts on Two Relatively Undisturbed Watersheds in Sewanee, TN Using Stream Side Visual Assessment**

James Kirchen, David Mills, Christopher Riddleberger  
*Department of Forestry and Geology*  
*Faculty Sponsor/Mentor: Scott Torreano*

Surface water quality was analyzed on two relatively undisturbed watersheds on the domain of The University of the South based on temperature, pH, total dissolved solids, conductivity, and chloride concentrations. We also conducted stream side visual assessments (SSVA) on the two streams based on USDA's Stream Visual Assessment Protocol. This visual assessment is represented in an interactive ArcGIS online map. Users are able to pinpoint where the stream assessments were conducted and view pictures of stream characteristics that are relevant to the grades of the assessments. This system would allow users to monitor water and stream characteristics with time.