



11 th **Annual Symposium**
CENTRE COLLEGE
RICE
April 12, 2018
RESEARCH·INTERNSHIPS
CREATIVE ENDEAVORS

The 2018 Symposium is sponsored by the
Dean's Office and all academic programs.

April 12, 2018

Dear RICE participants,

Welcome to the eleventh annual Centre College RICE Symposium! This event is the culmination of this year's expanded Undergraduate Research Week, which features a different research-focused event each day.

The RICE (Research, Internships, and Creative Endeavors) Symposium is a forum for showcasing the outstanding research achievements, creative endeavors, and independent projects completed by Centre students. An integral part of experiential learning is moving beyond the consumption of existing knowledge to becoming an active contributor of new knowledge. RICE represents a unique opportunity for students to share their contributions in a professional, scholarly setting that is made rich by the active participation of many members of our community. This event is part of a week-long celebration of research that has included opportunities for students to talk informally with faculty members about research opportunities, a convocation delivered by Dr. Christopher Barton, Centre Class of 1989 and Director of the University of Kentucky's Appalachian Center, and a lunch for student researchers and their faculty mentors.

This year, 94 presentations from across the academic disciplines are featured, including 66 oral presentations and 28 poster presentations. In addition, on Friday, April 13, students who participated in studio art classes this academic year will host an exhibit of their work in the AEGON Gallery in the Jones Visual Arts Center. We invite attendees to attend the various oral and poster presentations, as well as the art exhibition, and see the diversity of what Centre students have to offer.

Panels typically take two forms. First, in order to emphasize the interdisciplinary nature and breath of the scholarly endeavor at Centre College, many presentations are grouped by topic rather than discipline. For example, this year, we have two panels that focus on local issues and span a range of disciplines. Second, when it is important to emphasize the depth of a particular issue or collaborative research, such as the study that occurred in an advanced seminar class, a panel may include presentations from only one discipline.

Each oral presentation is scheduled for a total of 15 minutes, including 12 minutes for presenting and three minutes for discussion. As a courtesy to presenters, please wait until the end of a presentation to leave a session. Thank you for your consideration and enjoy the Symposium!

Sincerely,

Leonard Demoranville and Ellen Prusinski
2018 RICE Symposium Co-chairs

SCHEDULE AND TABLE OF CONTENTS

APRIL 12, 2018

Oral Presentations

Session 1, Young Hall
2:00 p.m. to 3:20 p.m.

Oral Presentations

Session 2, Young Hall
3:45 p.m. to 5:05 p.m.

Poster Presentations

Lobby, Norton Center for the Arts
5:30 p.m. to 6:30 p.m.

APRIL 13, 2018

Art Exhibition Opening

AEGON Gallery, Jones Visual Arts Center
3:30 p.m. to 6:30 p.m.

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ORAL PRESENTATIONS AT A GLANCE

SESSION 1-a Young 101 Moderator: Brett Werner	2:00 p.m.	1	Animal Enrichment at the Danville Boyle County Humane Society, <i>Emma Presberg</i>
	2:20 p.m.	2	Deserting Corner Stores: Food Deserts and Dollar General in Central Kentucky, <i>Rebekah Bruner</i>
	2:40 p.m.	3	On the Art of Homecoming, <i>Anna McCauley</i>
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SESSION 1-b Young 102 Moderator: Allison Connolly	2:00 p.m.	4	L'opéra comique en France, <i>Emma Hoenemeyer and Allie Morris</i>
	2:20 p.m.	5	The Language of Honey: An Interdisciplinary Analysis of Beekeeping in France, <i>Margaux Crider</i>
	2:40 p.m.	6	Global or American? The LGBT Movement around the World. / Mondial ou Américain? Le Mouvement LGBT autour du Monde, <i>Kathleen Murphy</i>
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SESSION 1-c Young 110 Moderator: Mark Rasmussen	2:00 p.m.	7	The Redemptive Power of Imagination in the Poetry of Emily Dickinson, <i>Tong Lin</i>
	2:20 p.m.	8	The House of Holiness and the Church of England: Contemporary Religious Discourse in "The Faerie Queene", <i>Emily Innes</i>
	2:40 p.m.	9	"I'm Going to Break the Wheel": Women, Chivalry, and Game of Thrones, <i>Kersey Reynolds</i>
	3:00 p.m.	10	Moral Vision in Flannery O'Connor, <i>Joseph Korona</i>
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SESSION 1-d Young 111 Moderator: Bruce Rodenborn	2:00 p.m.	11	Energy Dissipation in Reflecting Internal Waves, <i>Vrinda Desai and Matt Calvert</i>
	2:20 p.m.	12	A Robot Bacterium Near a Solid Boundary, <i>Grant Giesbrecht, Madi Bates, and Katha Ni</i>
	2:40 p.m.	13	Concentric Rotating Cylinders as a Model of Protoplanetary Disk Dynamics, <i>Courtney Gibson and Andrew Lewis</i>
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SESSION 1-e Young 112 Moderator: Marie Petkus	2:00 p.m.	14	The Effect of Contraception Access on Young Women's Educational Attainment, <i>Emily Dohrman and Marissa Hartsoe</i>
	2:20 p.m.	15	Empirical Study of Tax Policy, <i>Joshua Markwell and Devin Hayes</i>
	2:40 p.m.	16	Religiosity and Politics, <i>John Ferguson</i>
	3:00 p.m.	17	Fertility Effects of ACA-Related Medicaid Expansions, <i>Marissa Hartsoe</i>

ORAL PRESENTATIONS AT A GLANCE

SESSION 1-f Young 138 Moderator: Satty Flaherty- Echeverria	2:00 p.m.	18	La República Dominicana: Past and Present , <i>Amariah Ritchie and Kimberly Casso</i>
	2:20 p.m.	19	Brazil's Racial Paradise: Myth or Reality? , <i>Digna Rosales Cruz, Allison Perry, Lainy Castañeda, Mariama Minteh, Kimberly Casso, and Justin Nguyen</i>
	2:40 p.m.	20	Education in Brazil: What is at Stake? , <i>Erin Didier and Matheus Marlisson</i>
	3:00 p.m.	21	Juan Rulfo: Expressing 20th Century Mexican Inequality , <i>Rachael Ferguson and David Mauer</i>
<hr/>			
SESSION 1-g Young 201 Moderator: John Harney	2:00 p.m.	22	How Many Fisherman Does it Take to Sue a Powerplant: How Class and Status Affected Environmental Activism on Herrington Lake , <i>Emma Anderson</i>
	2:20 p.m.	23	Communities at a Crossroads: Repurposing Space for Community Performance , <i>Olivia Murrell</i>
	2:40 p.m.	24	The History of Boles Natatorium , <i>Madeline Huber</i>
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SESSION 1-h Young 213 Moderator: Jason Doroga	2:00 p.m.	25	An Investigation of the Access to Healthcare for Spanish-speaking Patients in Central Kentucky , <i>Carolyn Haugh</i>
	2:20 p.m.	26	Translating Neruda , <i>Adam Brown</i>
	2:40 p.m.	27	The Effects of Technology on Street Art , <i>Devin Baker</i>
	3:00 p.m.	28	Schenkerian Analysis: Understanding Fundamental Structures of Music , <i>Sebastian Duncan</i>
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SESSION 1-i Young 244 Moderator: Dan Manheim	2:00 p.m.	29	The American Mystique: Internal Relocation and Industry Change in the U.S. , <i>Zijun Deng</i>
	2:20 p.m.	30	Support Groups and their Ability to Incite Resilience among Military Families , <i>Clarence Lewis</i>
	2:40 p.m.	31	Change Over Time in Kilimi , <i>Tim Ablondi and Stephen Thornton</i>
	3:00 p.m.	32	Dreaming of the American Dream: How Education Impacts the Class Culture of Hispanic Immigrants in the United States , <i>Susie Saffari</i>

ORAL PRESENTATIONS AT A GLANCE

	3:45 p.m.	33	A Silver Lining to A Crisis: A Youth Substance Prevention Model for Liangshan, China, <i>Xiao Ma</i>
SESSION 2-a Young 101 Moderator: Kaelyn Wiles	4:05 p.m.	34	Imploding the Nuclear Family: Women in Recovery, <i>Liz Chavez</i>
	4:25 p.m.	35	Drug Addiction, Recovery, and Stigma in Boyle County, <i>John Ferguson</i>
	4:45 p.m.	36	High on a Believing: The Impact of Medical Marijuana on Traffic Fatalities and Violent Crime, <i>Rachael Ferguson and Charles Edelberger</i>
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SESSION 2-b Young 102 Moderator: Christian Wood	3:45 p.m.	37	The Brain Drain in Morocco, <i>Marisa Moore</i>
	4:05 p.m.	38	The Couturier's Work as Corporal Architecture: Construction and Deconstruction of "l'art moderne" in the Praxis of Martin Margiela and John Galliano, <i>Anthony Springate</i>
	4:25 p.m.	39	Exploring Sartre's "Gaze" through No Exit, <i>Billy Blake</i>
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SESSION 2-c Young 110 Moderator: Marie Nydam	3:45 p.m.	40	Dust Bathing Through a Neoichnological Lens, <i>Erika Brewer</i>
	4:05 p.m.	41	Claws and Effect: Examining the Influence of Geography on Veterinary Medicine, <i>Rachel Moore</i>
	4:25 p.m.	42	Identification of Arbuscular Mycorrhizal Fungi in the Endangered Running Buffalo Clover, <i>Brendan Holly</i>
	4:45 p.m.	43	Antibiotic Inhibition Studies, <i>Kelly Tran and Kate Sarkan</i>
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SESSION 2-d Young 111 Moderator: Jeffrey Heath	3:45 p.m.	44	The Value-Action Gap: What Barriers Exist for College Students? <i>Jimmy Robinson</i>
	4:05 p.m.	45	Experiences of First Generation College Students on Centre College's Campus, <i>Mariama Minteh</i>
	4:25 p.m.	46	Program Evaluation of the Substance Abuse Program at the Boyle County Detention Center, <i>Clarence Lewis</i>
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SESSION 2-e Young 112 Moderator: Kari Young	3:45 p.m.	47	Blue, Green, and Purple Glass: Analyzing the Relationship Between Glass Color and the Three Coloring Oxides, <i>Emma Huckestein</i>
	4:05 p.m.	48	Oxidation of a Lignin-Model Compound with Various H-dpaq Catalysts: A Kinetic Analysis, <i>Christian Apel</i>
	4:25 p.m.	49	Effective Teamwork: Analyzing How Individual Lineups Affect the Win Probability of a Basketball Team, <i>William Britt</i>
	4:45 p.m.	50	How are Programming Questions from Women Received on Stack Overflow? A case study of Peer Parity, <i>Savannah Morgan</i>

ORAL PRESENTATIONS AT A GLANCE

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	4:05 p.m.	52	The Politics of Cold War Citizenship: A Case Study , <i>Colleen Coyle</i>
	4:25 p.m.	53	Comfort Women in East Asia , <i>Sidney Spivey</i>
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SESSION 2-g Young 201 Moderator: Aaron Godlaski	3:45 p.m.	54	Juror Bias in High Publicity Murder Cases: Promoting Prospective Juror Honesty , <i>Breanna Olson, Janae McDonald, and Taylor Singleton</i>
	4:05 p.m.	55	Breaking the Prejudice Habit: A Longitudinal Assessment of an Intervention to Reduce Implicit Racial Bias , <i>Nicole Stumpp and Amy Sekar</i>
	4:25 p.m.	56	Quantifying Nature: The Relationship between Preference & Fractal Dimensions , <i>Marissa Metzger, Cheyenne Bunner, and Ke Li</i>
	4:45 p.m.	57	Fast Money: The Role of Response Time and Inhibitory Control in Money-Related Decision Games , <i>Lena Jewler and Breanna Carter</i>
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SESSION 2-h Young 213 Moderator: Jennapher Lunde Seefeldt	3:45 p.m.	58	To Concentrate or Devolve: Examining the Efficacy of Regional Governance in Chile and the US through Education Reform , <i>Peter O'Donnell</i>
	4:05 p.m.	59	Cognitive Dislocations and State Behaviors in the Korean Peninsula , <i>Bangchen Ruan</i>
	4:25 p.m.	60	The State of Happiness , <i>Siera Hanks</i>
	4:45 p.m.	61	"Corrective Rape": An Unintentional Consequence of the Collapse of Apartheid , <i>George Mason</i>
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SESSION 2-i Young 244 Moderator: Beau Weston	3:45 p.m.	62	Social Welfare: Jobs , <i>Erica Arbuckle and Annalise Tereck</i>
	4:00 p.m.	63	Social Welfare: Government , <i>Davis Kinkel and Hannah Reis</i>
	4:15 p.m.	64	Social Welfare: Voluntary Associations , <i>Holly Couch, Mark Murray, and Clay Rouse</i>
	4:30 p.m.	65	Social Welfare: Health (and Drugs) , <i>Maggie McLain and Xiao Ma</i>
	4:45 p.m.	66	Social Welfare: Crime (and Drugs) , <i>Lulu Peredo and Taylor Limbach</i>

POSTER PRESENTATIONS AT A GLANCE

5:30 p.m. to 6:30 p.m.

Norton Center for the Arts, Lobby

67. **Acceleration of AutoDock Vina with Containerization**, *Mark Hisle*
68. **Exploring Cost and Energy Efficient Alternatives for Running the GAMESS Computational Chemistry Software**, *Yin Song*
69. **The Effects of Expressive Writing and Positive Psychology on Female Body Image and Well-Being**, *Sarah Greene and Megan Reid*
70. **Bearing the Stress: Assessment of the Relationship between Hair Cortisol and Fecal Glucocorticoid Metabolite Levels in Bears**, *Je'Coiya Moore*
71. **Product Characterization of the Oxidation of Veratryl Alcohol Catalyzed by an Iron Coordination Complex**, *Emily Brown*
72. **Discovery of Novel MurA Inhibitors by Structural-Based Virtual Screening**, *Yuqian Dai*
73. **Design, Synthesis, and Screening of Peptide Inhibitors for the Treatment of Disease**, *James Rose and Adam Clark*
74. **Development of Mithramycin Based Anticancer Drug**, *Kate Jenkins*
75. **Microbial Communities in Potable Ethanol**, *Chloe Grove and Liza Goss*
76. **Internship at Ferm Solutions**, *Drew Howard*
77. **Retinol Esterification in *Homarus americanus***, *Casey Thompson*
78. **Isolating and Characterizing the Dadosky Bacteriophage**, *Benjamin Hammond*
79. **River18—A Novel Bacteriophage Isolated from Soil in Centre College**, *Liu Jiang*
80. **Isolation and Classification of *Mycobacterium smegmatis* bacteriophages from a Medium Titer lysate**, *Iona Palmer and Noah Gillis*
81. **Novel Antibiotic Identification**, *Dana Pencil and Gentry Brown*
82. **Assessing the Impacts of Herbivory on Running Buffalo Clover (*Trifolium stoloniferum*)**, *Timothy Grabenstein*
83. **The Effect of Drying Period on *Psephenus herricki* in Kentucky Freshwater Streams**, *Hannah Hamlin*
84. **Basketball Shot Chart Visualization Tool**, *Rao Fu*
85. **Comparing Education Systems in France, Germany, and the United States**, *Manasaa Kannan and Stephanie Keller*
86. **Community-Based Learning: Measuring the Student Experience**, *Jimmy Robinson*
87. **A Place of Connection: The Warehouse, Hemp, and the Railroad**, *Rebekah Bruner*
88. **The Centre College Warehouse: Where Societies Collide**, *Noah Martin*

POSTER PRESENTATIONS AT A GLANCE

5:30 p.m. to 6:30 p.m.

Norton Center for the Arts, Lobby

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| 89. Green vs. Growth: The Development of Zoo Atlanta , <i>Emma Presberg</i> | 92. Late Iron Age British Households within Roman Occupied Britain , <i>Catherine Doubles</i> |
| 90. The Flame Run: A Greater Historical Narrative , <i>Hibah Siddiqui</i> | 93. Identity and Acculturation in Boyle County: Mexican/Guatemalan Immigrants Discuss their Experience , <i>Jailene Paz</i> |
| 91. Working from Home and “Having it All”: How Professional Women Navigate Work-life Balance, <i>Cara Barnett</i> | 94. Food Deserts in Central Kentucky , <i>Nicholas Ngong and Rebekah Bruner</i> |

ART EXHIBITION

Friday, April 13, 2018

3:30 p.m. to 6:30 p.m.

AEGON Gallery, Jones Visual Arts Center

Members of the Art Program welcome you to an exhibition of work by students who have taken studio art classes this academic year.

A list of exhibiting artists and their works will be available in the gallery.

Light refreshments will be served.

ORAL PRESENTATION ABSTRACTS

1. **Animal Enrichment at the Danville Boyle County Humane Society**, *Emma Presberg*

Mentor: Brett Werner, environmental studies

Animal enrichment is an important part of captive animal care and involves anything that goes beyond the basic needs of the animal by increasing their physical and psychological well-being. Many places have designed animal enrichment programs that set a schedule of enrichment that is then observed to determine if the enrichment is being beneficial. Developing these enrichment programs and assessing their efficacy has become an integral part of animal care guidelines. The Danville Boyle County Humane Society (DBCHS) did not have an official enrichment program and this research looked at ways to develop and assess effective enrichment programs. This research was then put into practice by developing an enrichment program at the DBCHS.

2. **Deserting Corner Stores: Food Deserts and Dollar General in Central Kentucky**,

Rebekah Bruner

Mentor: Brett Werner, environmental studies

This research explored the relationship between Dollar General and rural food deserts within seven Central Kentucky counties. I created an Arc-GIS map of these counties, showing the grocery stores alongside Dollar General's. In order to ensure that the listed stores were in fact grocery stores -- those which contain fresh fruits and vegetables -- I "ground-truthed" each store and assessed their products. I then evaluated these maps by calculating the grocery stores per capita versus the Dollar General's per capita in each county. I narrowed my focus to Boyle county to analyze the historical relationship between food deserts and Dollar General. I compiled historical data of the openings and closings of these stores to find that grocery stores declined while Dollar General's increased. Following the quantitative data, I held interviews and collected surveys to assess if people use Dollar General as a grocery store, and found that many do.

3. **On the Art of Homecoming**, *Anna McCauley*
Mentor: Brett Werner, environmental studies

Prominent environmental authors, like Wendell Berry and Aldo Leopold, have investigated themes of place, ecological heritage, social farming, and homecoming. Following their footsteps, I set out to study the environmental history and preserve the stories of a small farm in Central Kentucky, finding that these features have been sculpted in to the very landscape. As the 7th generation of my family to live on this farm, I have begun investigating of the idea of my own homecoming, hoping to let the farm's heritage inform its future. The process of unearthing family histories has been coupled with research into the potential for small, sustainably-managed farms to fulfill various social functions; pursuit of food sovereignty, community enrichment, and promotion of local economies. What I have found through this process is that redemption of the land can be facilitated through the redemption of the historical narrative.

4. **L'opéra comique en France**, *Emma Hoenemeyer and Allie Morris*

Mentor: Allison Connolly, French

Because it encompasses such a variety of musical themes, the genre "opéra comique" proves difficult to grasp. In my work, I research the various components that define this musical style, and focus on the impact that this distinctly French creation had in France during its prime. To convey a deeper understanding of the genre, Allie Morris and I will perform the well-known duet « Duo des fleurs » by Léo Delisle from the opéra comique *Lakmé*.

5. **The Language of Honey: An Interdisciplinary Analysis of Beekeeping in France**, *Margaux Crider*

Mentor: Allison Connolly, French

Love may be the honey of life, but honey itself is much more. Honey is hope, pain, lust, beauty, and sustenance. In parallel, we humans are disciples, thieves, gluttons, lovers, and tyrants. Observing the biblical, mythological, and

medieval language of honey, I structure a biodynamic and biological commentary on beekeeping techniques present in modern day France. As industrial agriculture intensifies, so do instances of colony collapse disorder, insecticide application, invasive species takeover, and apiarian disease. Without pollination, France, and the world, confronts a daunting agricultural and moral threat—the collapse of the food system and the loss of our very life source. Thus, in the face of this apiarian crisis, more is at stake than honey. By slowly deciphering the language of honey, using it to inform our interactions with the natural system, we will be better equipped to conduct ourselves in a world with progressively fewer bees—or optimistically, to reverse that trend.

6. **Global or American? The LGBT Movement around the World. / Mondial ou Américain? Le Mouvement LGBT Autour du Monde**, *Kathleen Murphy*

Mentor: Allison Connolly, French

In an increasingly globalized world, many countries view their values, cultures and identities as under threat, particularly with regards to LGBT rights. As the LGBT movement began in the United States and American organizations and policies often support LGBT rights abroad, the development of LGBT rights activism across the world has created questions of neo-imperialism. These questions have generated concern about whose interests LGBT movements represent and who truly gains from the actions of these movements. This study responds to the questions, determining whether the LGBT movement represents a program of action supporting Western interests or whether truly global LGBT movements exist with understanding and respect for of non-Western sexualities. This study will analyze the structure, context and goals of two LGBT movements—one from France and one from Uganda—comparing how each developed and has approached challenges.

7. **The Redemptive Power of Imagination in the Poetry of Emily Dickinson**, *Tong Lin*

Mentor: Daniel Manheim, English

Imagination has the power to estrange us from what is once familiar to us by adding a new perspective and hence change our perception, as Milton says, “the mind is in its own place, and in itself can make a Heaven of Hell, a Hell of Heaven” (Milton 11). This study attempts to demonstrate how one’s imagination alters perceptual experience in Emily Dickinson’s poetry. For Emily Dickinson, life’s experiences are easily missed, because things are brief and elusive. She uses her imagination to contemplate the essential nature of the passing and demonstrates how our awareness of the infinitesimal brevity of a particular life could be transformed through the uniqueness of feelings.

8. **The House of Holinesse and the Church of England: Contemporary Religious Discourse in "The Faerie Queene"**, *Emily Innes*

Mentor: Mark Rasmussen, English

After the Protestant Reformation transformed the religious landscape of sixteenth-century Europe, England struggled to determine a religious identity in the face of pressure from both Catholics and Protestants. Edmund Spenser, a prominent Elizabethan poet, used his writings to navigate this tension between the fundamentally opposing theologies, particularly with "The Faerie Queene." Published in 1590, the poem represents Queen Elizabeth’s construction of the Church of England as a compromise between the two dominant religions and a means by which to preserve religious (and political) peace. The tenth canto of the first book especially explores the contemporary religious discourse of Elizabethan England. The House of Holinesse includes elements of both Protestantism and Catholicism, a combination of which presents a case for Anglicanism as the true religion of England, as embodied by the Redcrosse Knight, who serves as an allegorical figure for both England and the Church of England.

9. **"I'm Going to Break the Wheel": Women, Chivalry, and Game of Thrones**, *Kersey Reynolds*

Mentor: Mark Rasmussen, English

According to medieval literary scholar Maureen Fries, female characters found in the Arthurian legend are restricted to three character types: the heroine, the female hero, and the female counter-hero. Within the legend's chivalric setting, these figures are all defined exclusively by their relations to men. This paper will apply Fries' taxonomy to the women of Game of Thrones to demonstrate that the show's omission of chivalry from the medieval fantasy setting removes these women from Fries' limited categorization, and allows them a far greater autonomy than is found for women in the Arthurian tradition. The comparison speaks to the exceptional strength and independence of the women portrayed in Game of Thrones.

10. **Moral Vision in Flannery O'Connor, *Joseph Korona***

Mentor: Mark Lucas, English

This paper will examine the ways in which morality is presented in Flannery O'Connor's short story, "The Lame Shall Enter First." O'Connor underscores the distinction between the appearance of morality and morality itself. This contradiction is explored through an analysis of the behavior of O'Connor's characters.

11. **Energy Dissipation in Reflecting Internal Waves, *Vrinda Desai and Matt Calvert***

Mentor: Bruce Rodenborn, physics

Internal oceanic waves reflecting from sloping topography may be an important mechanism by which the internal tides are dissipated. We used a wavemaker in a linearly stratified tank and particle image velocimetry (PIV) to measure the velocity fields of simulated waves. We varied the boundary angle and determined how much energy was dissipated in the reflection process using the PIV data and a method by Lee et. al. to find the energy flux. We found very high rates of energy dissipation when the boundary angle matched the wavebeam angle and found similar results in matching numerical simulations. These results may help explain why continental slopes

are eroded to the same angle as internal waves in that region.

12. **A Robot Bacterium Near a Solid Boundary, *Grant Giesbrecht, Madi Bates, and Katha Ni***

Mentor: Bruce Rodenborn, physics

Our experiment studies the effects of a nearby boundary on how bacteria swim using a model robotic bacterium. We study the propulsive characteristics of bacterial swimming by measuring the force, torque, and drag on a model helical flagellum. In order to scale the fluid dynamics, our robot swims in highly viscous silicone oil rather than water so that the Reynolds number is the same. We measure the force using a scale connected to the robot and record the data on a computer. We use Matlab to collect and analyze the data from these readings. We find that as the model flagellum is placed closer to the boundary, the propulsive force is much larger than away from the boundary. However, we also find the surprising result that changing the direction of rotation changes the force we measure. Measurements of propulsive forces as a function of boundary distance have not been reported in the scientific literature, and we hope to publish our results soon.

13. **Concentric Rotating Cylinders as a Model of Protoplanetary Disk Dynamics, *Courtney Gibson and Andrew Lewis***

Mentor: Bruce Rodenborn, physics

The Taylor-Couette apparatus is a basic model of protoplanetary disks, and could give insight into the early development of planets. The apparatus consists of two concentric cylinders that can co-rotate and counter-rotate with a fluid between them. As the cylinders rotate independently of one another, a sheer flow creates different predictable flow states that all occur at different Reynold's numbers [as the cylinders rotate at different angular velocities]. After introducing a density gradient into the system, we found different flow states that occurred at the same Reynold's numbers. Our goal was to map out and document these new flow states that formed in a

fluid with a density variation along its axis of rotation.

14. The Effect of Contraception Access on Young Women's Educational Attainment, *Emily Dohrman and Marissa Hartsoe*

Mentor: Marie Petkus, economics

In 2009, a private donor funded the Colorado Family Planning Initiative (CFPI) that expanded access and information about Long Acting Reversible Contraceptives with an emphasis on access for low income women. Over the course of six years, the CFPI provided intrauterine devices and implants to more than 36,000 women across the state. Previous literature has found a highly significant decrease in unintended pregnancies. This study uses data from the American Community Survey to determine how the program impacted teen birth rates, and whether a decrease in birth rates affected the probability that teen girls will drop out of high school.

15. Empirical Study of Tax Policy, *Joshua Markwell and Devin Hayes*

Mentor: Marie Petkus, economics

The Building Excellent Schools Today (BEST) program, administered by the Colorado Department of Education, began in 2008. The purpose of the BEST program is to provide funding for capital construction needs and school renovations. In 2014-2015 the BEST program became partially funded by the excise tax on retail marijuana sales. In this study, we use data from the Colorado Department of Education for the years 2010 through 2017. We are looking to determine if the excise tax on marijuana sales helped increase the proficiency levels on state standardized tests of schools that were awarded BEST funding before and after the excise tax funding began contributing to the BEST Program. Using data from the Colorado Department of Education, we used statistical modeling to observe possible relationships between various demographic variables and test score levels for schools that received BEST program funding.

16. Religiosity and Politics, *John Ferguson*

Mentor: Marie Petkus, economics

Religion has historically intersected with U.S. politics. For example, the Religious Right is seen as the most significant modern day religious influence on politics. However, beyond visible figureheads, little is known about the composition of political-religious conglomerates and their impact on voter behavior. This study takes an exploratory step into establishing what religious affiliations predict political behaviors, and to what extent. Using econometric methods, I conclude that, while specific denominations aren't statistically distinct from each other in their effects on members' political beliefs, religious affiliation does tend to have a statistically significant conservative influence. This research indicates that the effect of religion on politics depends more on the framing and perception of a given issue, rather than any inherently "religious" components of the issue at hand.

17. Fertility Effects of ACA-Related Medicaid Expansions, *Marissa Hartsoe*

Mentor: Maria Apostolova, economics

The voluntary state-level Medicaid expansions from the Affordable Care Act (ACA) provide a natural experiment for studying the effects of additional health insurance coverage on various health outcomes. We use a difference-in-differences model comparing expansion and non-expansion states to empirically estimate the effects of these expansions on the probability of having a child. Our preliminary analysis supports the results of an earlier study of the fertility effects of the 2007 Massachusetts health care reform. Our evidence suggests the Medicaid expansions led to an increase in the probability a married woman between the ages of 20 to 34 has given birth in the previous year. Additionally, there is evidence to suggest the expansions led to a decrease in the likelihood an unmarried woman of the same age group has given birth in the past year.

18. La República Dominicana: Past and Present, *Amariah Ritchie and Kimberly Casso*

ORAL PRESENTATION ABSTRACTS

Mentor: Satty Flaherty-Echeverria, Spanish

This presentation focuses on two particular moments in Dominican history: the end of the Trujillo Regime and the development of Dominican communities in the United States. We focus on the cultural and linguistic changes that Dominicans experienced and examine the ways in which culture and language influenced the end of the regime as well as the development of the Dominican diaspora in the United States.

19. **Brazil's Racial Paradise: Myth or Reality?**, *Digna Rosales Cruz, Allison Perry, Lainy Castañeda, Mariama Minteh, Kimberly Casso, and Justin Nguyen*

Mentor: Satty Flaherty-Echeverria, Spanish

Our Centre Term Brazil 2018 class questioned: How does race impact Brazilian society? We learned the official narrative on race that claims the country has a "racial democracy" as well as witness and experienced the realities of racial inequity present in Brazilian society. This presentation is a showcase of our observations and experiences in regards to the complexity of racial dynamics and racial relations in present day Brazil.

20. **Education in Brazil: What is at Stake?**, *Erin Didier and Matheus Marlisson*

Mentor: Satty Flaherty-Echeverria, Spanish

The Lula administration (2003-2011) opened up equal access to education for most Brazilians. However, due to the turmoil of the recent political crisis in Brazil (2014-Present), the access to education could change significantly. In this presentation, we evaluate the state of basic education in Brazil and its disproportionately negative impact on underprivileged citizens. Inspired by ideas discussed while interviewing Rio de Janeiro state congressman Wanderson Nogueira, we envision education as a viable way to change the future of Brazil, an emerging country that continues to face social, cultural, political and economic challenges.

21. **Juan Rulfo: Expressing 20th Century Mexican Inequality**, *Rachael Ferguson and David Mauer*

Mentor: Willie Costley, Spanish

During Mexican author Juan Rulfo's life, he experienced dramatic changes in Mexican society. We look at two of his short stories, "Nos han dado la tierra" and "Es que somos muy pobres," both found in the literary compilation, *El llano en llamas*. We interpret the texts through the context of Mexico's history preceding the publishing in 1953. Specifically, we connect the texts to the contexts of the end of the Porfiriato through the rule of Cardenas. We also explore Juan Rulfo's personal stake in the surrounding events as he was raised in an unconventional household in an agricultural based community in Jalisco. Our analysis concludes that he uses imagery as well as religious themes to tell of the plight of the common Mexican landowner and the economic inequalities that many faced after the Mexican Revolution.

22. **How Many Fisherman Does it Take to Sue a Powerplant: How Class and Status Affected Environmental Activism on Herrington Lake**, *Emma Anderson*

Mentor: Beau Weston, sociology

This paper examines the variety of responses that people have to environmental problems that closely affect them. Data was collected as part of a lawsuit against KU power plant for groundwater contamination and high levels of Selenium in the fish populations of Herrington lake. I interviewed people that were directly impacted by the lake, who would be most susceptible to contamination. The variety of responses led me to several questions. Why did some people dismiss me outright and some people listen to what I had to say? Why do people directly impacted by environmental contamination oppose interference? To explore these questions I turned to social theorists Pierre Bourdieu and Max Weber, applying Bourdieu's theory of class-based taste distinction and Weber's description of status honor. By examining my interactions with lakeside inhabitants, I was able to illustrate how status plays a role in the ways that individuals respond to environmental problems.

23. Communities at a Crossroads: Repurposing Space for Community Performance, *Olivia Murrell*

Murrell

Mentor: Sara Egge, history

The Civic Theatre of Greater Lafayette is the community's place to come together and act, direct, or watch community-led productions. The theatre found its permanent home in the old abandoned Monon Railroad Depot, which once was a key checkpoint to and from Chicago by way of The Hoosier Line. This railway served passengers and transported freight from Chicago to Indianapolis and Louisville, where the journey could continue into Florida. The depot was unique in that it was nestled in the heart of downtown Lafayette, the train running down the middle of 5th Street. This project seeks to examine primary sources produced during two separate time periods that both trail the different ways that the community can interact in these spaces. The theatre is a crossroads where not only Chicago and The South meet, but also where transportation and performance come together to shape Lafayette's history and relationship with the environment.

24. The History of Boles Natatorium, *Madeline Huber*

Madeline Huber

Mentor: Sara Egge, history

It was not hard for me to decide to do a project about Boles Natatorium. As a former swimmer for Centre College and a current lifeguard, I spend a lot of time at this pool. So after noticing the deterioration of the building and the few people who actually use the pool besides the swim team, it got me to thinking of what the pool used to be like when it first opened and how it has changed over the years. My project will delve into this change overtime and how this pool no longer sees its use by diverse peoples. This tells us that the values we put on a space can change overtime. I plan to look at this change and what values still exist within this space.

25. An Investigation of the Access to Healthcare for Spanish-speaking Patients in Central Kentucky, *Carolyn Haugh*

Carolyn Haugh

Mentor: Jason Doroga, Spanish

Language barriers significantly impact Limited English Proficiency (LEP) patients in Kentucky. In this work, I focus on the linguistic and health-related resources, specifically interpreters, available to Spanish-speaking LEP patients in Central Kentucky. I discuss the access to and quality of interpreters in Central Kentucky in comparison to other Spanish-speaking communities and non-LEP patients in the US in order to discern differences and/or disparities between these groups. From my research, I identified five themes that affect access to quality care for LEP patients: 1) Interpreter training 2) Access to interpreters in different medical settings 3) Transportation barriers 4) Lack of patient education 5) Cultural and linguistic barriers present in medical interactions. I will discuss how lack of patient education and cultural barriers on both the patient and physician sides significantly inhibits efficient communication between interpreters, healthcare workers, and LEP patients.

26. Translating Neruda, *Adam Brown*

Mentor: Jason Doroga, Spanish

"Attacks on the translation of poetry are simply the barbed edge of the general assertion that no language can be translated without fundamental loss." –George Steiner Through an independent study into translation over the month of January 2018, I read *After Babel*, *Decir Casi lo Mismo*, and *Translating Neruda: The Way to Macchu Picchu* before embarking on my own task of translating ten of Pablo Neruda's *Odas Elementales*. Through my presentation, I will describe the process of translation in which I applied what I learned from three authorities on the topic to my own translations of the *Elemental Odes*. Additionally, I will discuss how my translations of the poems "Ode To A Chestnut On The Ground" and "Ode To Sadness" differ from professional translations of those two poems and how my decisions affect the tone, diction, meaning, and imagery. Can a translation of poetry ever do justice to the original? Is a chestnut a spiny sea

urchin or a hedgehog? And do those questions even matter?

27. The Effects of Technology on Street Art, Devin Baker

Mentor: Amy Frederick, art history

This presentation seeks to investigate the connections between street art and technology. Street art is any art developed in public spaces, although this definition does not include graffiti, which is considered a separate art form. Through the use of technology, the accessibility that was once a hallmark of street art has recently become complicated. Although street art and technology began in almost completely unrelated contexts, today it would be nearly impossible to discuss them separately. Street artists have recognized this undeniable connection between technology and street art and are now experimenting with new ways to create their art, particularly through augmented reality (AR) and the creation of their own apps. These technological advances change and sometimes limit the viewers' experience of this art.

28. Schenkerian Analysis: Understanding Fundamental Structures of Music, Sebastian Duncan

Mentor: Larry Bitensky, music

In the early 20th Century, Austrian music theorist Heinrich Schenker revolutionized the systems we use to interpret and understand music. Schenker developed a theoretical process that attempts to identify the underlying structure of a musical composition, by analyzing reductive levels of tonal organization. This presentation is intended as an accessible introduction to Schenkerian techniques and the musical traditions that they draw from. I will also be presenting some of my own analyses, completed during my ongoing independent study of Schenkerian analysis.

29. The American Mystique: Internal Relocation and Industry Change in the U.S., Zijun Deng

Mentor: Robyn Cutright, anthropology

One in nine Americans moved in 2016 according to United States Census Bureau for housing-related, family related and employment-related reasons. The question arises is that how does American's decision to move interact with the change in job industries? This paper explores the correlation between change in industry types and the amount of internal relocation inside the United States using regression analysis of Census data and structured interview. A quantitative and qualitative analysis of employment-related moving can provide a fuller understanding of the American mystique: migration within the United States. This question is important because it affects the change in overall population in different areas, which would affect the amount of government funding in different areas in order to accommodate the increase or decrease in population.

30. Support Groups and their Ability to Incite Resilience among Military Families, Clarence Lewis

Mentor: Robyn Cutright, anthropology

The goal of this study is to explore the ability of support groups to incite resilience among families of active duty military members. Specifically, I investigate whether or not the Forward Readiness Group (FRG) creates resilience among families during stressful periods of prolonged and sporadic separation. Resilience, for the purpose of this study is defined as the ability to adapt positively by broadening one's perspective, or learning a new coping skill when faced with stress. Through interviews with current and former military spouses I hope to produce personal experiences of resilience during stressful periods of time through the eyes of the families who faced them. This study aims to broaden the application of social theory into a sector of military life which has not been extensively studied and would provide insight into the nature of informal and formal support groups for military families.

31. Change Over Time in Kilimi, Tim Ablondi and Stephen Thornton

Mentor: Endre Nyerges, anthropology

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Our presentation illustrates how Geographic Information Systems (GIS) can be used to show change in land cover over time. To do so, we have focused our research on a small region of land in the Kilimi National Park in Sierra Leone. We analyze satellite images from throughout the year and across many years. We are able to view the spectral reflectance of each pixel in these images and classify each pixel as a land form, either Savanna, Forest, River, Hardpan, etc. Then we compare our finished images to detect pixels that are not classified the same. These pixels represent change in land cover over time. This change in land cover can be explained as either seasonal, the effects of climate-change or the results of human actions. Our presentation will cover the techniques and procedures we use to classify and compare these images.

32. **Dreaming of the American Dream: How Education Impacts the Class Culture of Hispanic Immigrants in the United States**, *Susie Saffari*
Mentor: Beau Weston, sociology

As of 2016, there were 42.4 million immigrants living in the United States. Immigration has been threaded throughout the history of the United States, with immigrants from numerous different countries coming to America in hopes of living a better life than what they had in their homeland. In spite of being a country propelled by the work of immigrants, the stratification of society in the United States is not one that lends itself easily to access to the elusive "American Dream" for some foreign-born residents. Yet immigrants keep coming, and they bring with them varying levels of education attained in their native countries. A series of conversations with Hispanic immigrants living in central Kentucky, showcasing a variety of education levels, highlights the ways in which the level of education attained in the home country affects an immigrant's opportunity for social mobility within the United States, offering hope for a better life for some, and despair for others.

33. **A Silver Lining to A Crisis: A Youth Substance Prevention Model for Liangshan, China**, *Xiao Ma*

Mentor: Kaelyn Wiles, sociology

Substance abuse has become one of the world's most prevalent, costly, and challenging social health problems today. In the Liangshan Yi Prefecture, Sichuan, southwestern China, substance abuse is rampant among the local residents, including the youth population. Despite the importance of youth prevention, there is little empirically researched recommendations for youth intervention methods to be implemented at the local level. My research aims to examine the key features and applicability of several foreign models for youth prevention programs, and to create a new model designed in accordance with the local situation. In the spring term, I will continue my preliminary investigation through literature review, data mining and comparative analysis of different models. In the summer, I will shift to field work in Liangshan, including conducting surveys and interviews. By further analyzing the data, I expect to build the new youth prevention model by the end of the summer.

34. **Imploding the Nuclear Family: Women in Recovery**, *Liz Chavez*
Mentor: Kaelyn Wiles, sociology

During the fall, my Sociological Methods class partnered with the Boyle County Agency for Substance Abuse Policy (ASAP) to conduct interviews and surveys in order to find the barriers of recovery from addiction in this area. Overall, we found a lack of rehabilitative services in general, but especially so for women. Previous research indicates that women have a particularly difficult time finding treatment options to suit their needs. This semester I conducted several interviews with women in recovery from substance abuse in order to find out the challenges they faced in Boyle County. At the end of this research, I will share my findings with ASAP and hope that this will help them in allocating funds towards rehabilitative program geared towards women in Boyle County.

35. **Drug Addiction, Recovery, and Stigma in Boyle County**, *John Ferguson*

Mentor: Kaelyn Wiles, sociology

Individual drug addiction to opioids has become more pervasive because of overaggressive prescription of opioids by doctors in the 80s-90s. Although drug addiction remains a prevalent phenomenon in Central Kentucky, most Centre students lack any personal understanding of the devastating effects that opioid abuse has on the surrounding community. While more efforts are required, one example of Centre's effective engagement with the community was a Community Based Learning class during the fall of 2017. Data collected by Centre students and faculty on drug addiction and recovery started to illuminate nuances of the epidemic in Boyle County and potential ways to respond to the crisis. I will be presenting my analysis in the context of the broader literature on the opioid epidemic. These findings can help inform our community partners and political representatives on how best to reach out to those battling addiction, and provide the assistance that these populations need.

36. **High on a Believing: The Impact of Medical Marijuana on Traffic Fatalities and Violent Crime**, *Rachael Ferguson and Charles Edelberger*
Mentor: Marie Petkus, economics

Our research investigates the impact of the legalization of medical marijuana on violent crime rates and traffic fatality rates. As the debate on medical marijuana becomes a household conversation, it is important to examine its effects on society. Previous research on the topic of marijuana regulations has found contrasting results. We create a state-level dataset from multiple government crime databases and the Current Population Survey from 2008-2013. Our findings indicate that medical marijuana legalization has no impact on violent crime and a significant but small increase on traffic fatalities. We conclude that an increase in violent crimes and traffic fatalities should not be a concern for future legislation on medical marijuana.

37. **The Brain Drain in Morocco**, *Marisa Moore*

Mentor: Allison Connolly, French

In 2009, approximately 10% of Moroccans lived outside of Morocco (Cohen, 2010), with one of their primary residences being France. The reasons for why these individuals choose to leave their country of origin vary, however the vast majority are tied to socio-economic concerns. In France, immigrants can acquire the knowledge and expertise that can ultimately offer them chances at a better life. The simple truth is that the majority of educated Moroccans, those that are the best equipped to improve Morocco's development, choose to work and live outside of Morocco, a situation known as the brain drain. However, it is possible to transform the current situation into a "brain gain" if Morocco develops a plan to stimulate the economy involving the reinforcement of diverse and crucial institutions. Simultaneously, France must also adjust policies concerning immigrants such as "immigration choisie" which favors the propagation of the problem.

38. **The Couturier's Work as Corporal Architecture: Construction and Deconstruction of "l'art moderne" in the Praxis of Martin Margiela and John Galliano**, *Anthony Springate*
Mentor: Allison Connolly, French

As fashion serves to create the fleeting architecture of the body, while architectural modes are, in general, always subject to the evolving values of the societies wherein they are found, the three principles of architectural modernism must be applicable to and observable within modern fashion. The principles are as follows : first, that « form follows function » (attributed to Adolf Loos) ; next, that « ornament is a crime » (Louis Sullivan) ; and finally, that « less is more » (Ludwig Mies Van der Rohe). Taking the works of couturiers Martin Margiela and John Galliano for example, I will affirm that, despite the ostensible differences in their aesthetics, these two men demonstrate that, in order for fashion to be a specifically modern form of architecture and, thus, of modern art, the aforementioned principles are essential to

any practical understanding of modernity on an individual basis.

39. Exploring Sartre's "Gaze" through No Exit,
Billy Blake

Mentor: Christian Wood, French

As a rich, but often overlooked, source Jean Paul Sartre's ontological essay Being and Nothingness serves as an inquiry into the mechanisms of inter-subjectivity. This paper examines this subjectivity in the context of his well-known play No Exit, where the lines between objectivity and subjectivity become blurred for the characters, and the audience. One particular focus is the relationship between audience and character when viewing a play, and how this dynamic adds a further layer of complexity to each work. The audience has an objective position in the viewing of the play, but by the same token the characters have the same objective view of their audience. This reciprocal relationship between each sphere offers a more general insight into both the creative and aesthetic measures in the texts. Through this analysis we can explore answers to such questions as, "how can beings reciprocally exist and relate as both object and subject in the material world?".

40. Dust Bathing Through a Neoichnological Lens,
Erika Brewer

Mentor: Amanda Falk, biology

Dust bathing is a behavior that can be observed in many species and occurs when an organism settles into media and tosses it up and over its body. Although there is no evidence of dust bathing in the fossil record, it is a common behavior performed by some species of birds such as the domestic chicken (*Gallus gallus domesticus*). Here, Japanese quail (*Coturnix japonica*) is used in a neoichnological study to determine which media conditions are favored for this behavior. Medium-sized sand with 0%-4% water weight is more preferred than saturated substrate with small grain size (i.e., clay). Smaller grain sizes caused the bird to stick to the substrate which decreased the subject's overall locomotion and ability to dust bathe.

Understanding how conditions such as water saturation and grain size affect behavior will support investigations into the fossil record for similar environmental conditions.

41. Claws and Effect: Examining the Influence of Geography on Veterinary Medicine,
Rachel Moore

Mentor: Amanda Falk, biology

Hondo Veterinary Hospital is situated between the suburbs of San Antonio, the seventh largest city in the United States, and the small farming communities of Medina County. This unique location results in a diverse clientele base and patient makeup, and allows for valuable comparison of urban and rural factors and their impact on a variety of health variables. The causal relationship between geographic factors and patient outcomes witnessed in Hondo provide an argument for One Health: a trans-disciplinary approach to medicine that focuses on connections between human, animal, and environmental health. While One Health has been somewhat emphasized on a national and global level, its use is rarely highlighted at the local level and its potential implementation in the Western world is largely overlooked. Using several Hondo Veterinary Hospital patients as case studies, we see room for the application of One Health locally in the United States.

42. Identification of Arbuscular Mycorrhizal Fungi in the Endangered Running Buffalo Clover,
Brendan Holly

Mentor: Matthew Klooster, biology

Running Buffalo Clover (RBC) is an endangered species of clover native to Kentucky. Unlike most clovers, RBC has lost the ability to fix nitrogen and is phosphorus limited. No RBC-fungal relationships have previously been studied, but we hypothesized that the plant would have a mutualistic association with arbuscular mycorrhizal fungi (AMF) to aid in phosphorus and nitrogen uptake. We found significant evidence of AMF using the microscope-intersection method with a black ink root stain, showing a high colonization rate of 78.7% in the first

population examined. We used genetic analyses to identify the taxa and species diversity of the AMF infection. The discovery of AMF in the endangered Running Buffalo Clover can help guide conservationists when they reintroduce RBC to new areas, as the simultaneous introduction of AMF may provide a competitive advantage for newly planted RBC populations.

43. Antibiotic Inhibition Studies, Kelly Tran and Kate Sarkan

Mentor: Peggy Richey, biology and biochemistry & molecular biology

The efficacy of antibacterial drugs is decreasing due to the evolution of drug-resistant bacteria. Bacterial resistance to antibiotics can be combatted through the identification of novel chemical inhibitors of enzymes that synthesize the peptidoglycan in bacterial cell walls. Previous research has focused on the inhibition of MurA, an enzyme involved in one of the early steps of peptidoglycan synthesis. 1,3,4-cyclohexanetricarboxylic acid (LT040), identified through in silico screening as a putative MurA ligand, showed modest inhibition of Gram-negative bacteria. It is possible that LT040 only modestly inhibits Gram-negative bacteria because the outer cell membrane of these cells reduces penetration of the drug. Recently published research showed that pentamidine, an anti-protist drug, facilitates uptake of antibacterial drugs by Gram-negative cells. LT040 and pentamidine were used in combination to determine whether pentamidine enhances the inhibition of *Esherichia coli* by LT040.

44. The Value-Action Gap: What Barriers Exist for College Students?, Jimmy Robinson

Mentor: Kaelyn Wiles, sociology

The problem that this project will address is that there exists a gap between the values that people hold and the actions that they perform. This problem is evidenced in the discrepancy between the large growth in environmental values and the lack of corresponding action or lessening of environmental degradation. One of the ways of addressing this gap is the

information deficit model, which states that information about environmental issues is a way of filling the gap and connecting values to action. However, this notion has recently been pushed back against for its inadequacy in filling the gap due to the lack of recognition of other important barriers. In interviewing ENS majors, it is assumed that they have a working knowledge of environmental issues; therefore, if there still exists a gap between the values they hold and the actions they perform, then there must be other barriers in the way than lack of information.

45. Experiences of First Generation College Students on Centre College's Campus, Marima Minteh

Mentor: Robyn Cutright, anthropology

This paper explores the experiences of first-generation college students on Centre College's campus. There has been previous research done on the first-generation college students in different contexts and campuses but not one on Centre College. My research will focus mostly on looking at the first-generation college student experiences in relation to the unique new scholarship program offered to a selected first-generation college students on my campus. Through interviews with different first-generation college students on Centre's Campus and surveys, I plan to investigate both the experiences of first generation college students and what impacts if any, has creating this scholarship group had on the lives of first generation college students and the Centre Community.

46. Program Evaluation of the Substance Abuse Program at the Boyle County Detention Center, Clarence Lewis

Mentor: Kaelyn Wiles, sociology

This research project is designed to function as a program evaluation of the Substance Abuse Program (SAP) at the Boyle County Detention Center. This is a continuation of previous research done last semester for Sociological Research Methods (ANT/SOC 305) with Dr. Wiles.

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Our previous research revealed that given the number of people going to jail for substance abuse, there aren't enough programs or funding for programs that support these people in rehabilitation and recovery. Through our research I was able to establish a connection with Brian Wofford, the Chief Deputy of the detention center, and Tanith Wilson, director of the SAP. My data collection method includes interviews with Brian and Tanith, and observations of the SAP courses. It is my hope that this research will provide evidence for Brian and Tanith to utilize when advocating for funding and support of rehabilitation programs in detention centers in the state of Kentucky.

47. Blue, Green, and Purple Glass: Analyzing the Relationship Between Glass Color and the Three Coloring Oxides, *Emma Huckestein*

Mentor: Karin Young, chemistry

This research explores the elemental coloring properties of glass to understand the coloring effect of iron oxide, manganese(II) oxide, and copper oxide. Using a combination of fundamental network formers and modifiers with iron oxide, manganese(II) oxide, and copper oxide of varying percentages, glass is synthesized in inorganic solid state reactions. Independently, iron oxide produces blue or green glass, manganese(II) produces purple or pink, and copper produces blue. However, varying the percentages of the three coloring oxides creates a dependent relationship in which the colors produced are analyzed visually to determine the dependency of color upon the percentages of the three coloring oxides.

48. Oxidation of a Lignin-Model Compound with Various H-dpaq Catalysts: A Kinetic Analysis, *Christian Apel*

Mentor: Karin Young, chemistry

Lignin is a natural aromatic polymer with the potential for becoming an important carbon feedstock. This project focuses on the development of a more environmentally friendly process for the degradation of lignin utilized by the paper industry. The inspiration for our

research comes from modeling the naturally occurring oxidation of lignin by white-rot fungi. Using veratryl alcohol as our lignin-model compound, we are able to analyze the kinetics of this oxidative reaction with oxone and either an iron, manganese, or cobalt metal complex catalyst. This strategy has made it possible to study the rates at which veratryl alcohol and the subsequent products of reaction change in concentration over time. From these studies, we are able to better understand the reaction mechanisms at work using a lignin-model compound. Eventually, we hope to apply our findings to a larger, industrial scale for the degradation of lignin.

49. Effective Teamwork: Analyzing How Individual Lineups Affect the Win Probability of a Basketball Team, *William Britt*

Mentor: Jeffrey Heath, mathematics

Over the years, sports teams, both collegiately and professionally, have stepped into the world of analytics more and more. While the advanced stats that we currently use are proving noticeably useful, we have been able to find several flaws in them. In response to this, I created a computer program with the goal of it being able to find a solution for these issues associated with today's advanced metrics. The program is designed to sort through and analyze the box scores for any basketball game, and find which lineups that are played together, are the most effective and add to the win probability the most. The program was coded in the python programming language and the University of Kentucky's Men's basketball team was used as the source for the team statistics.

50. How are Programming Questions from Women Received on Stack Overflow? A Case Study of Peer Parity, *Savannah Morgan*

Mentor: Michael Bradshaw, computer science

Stack Overflow is a useful Q&A online community for programmers. However, it has not been as popular among programmers who are women. Prior studies have shown low participation of women programmers on Stack Overflow, but

have not demonstrated how the presence of their peers may promote activity. In this work, we explore how the presence of women, through peer parity, can encourage women to participate more on Stack Overflow. We extracted 3,2209,817 posts from the most recent Stack Overflow data dump. By modifying a popular gender computing tool, we took the first names of online users and identified the gender of 2,502,438 users from the 5,987,284 list of current users. We randomly selected peer parity and non peer parity questions asked by women and identify differences in participation on those posts. We found that women become more active after they have taken part in a peer parity post.

51. Pluralism in Nationalism: Indian Responses To Britain's World War, Adeel Ahmed

Mentor: Amos Tubb, history

During the fall of 2017, I took HIS 500 with Dr. Amos Tubb to complete my History Major. The History Seminar course tasks each student with researching and writing a twenty-five-page paper. I chose to study nationalism in India during World War II, specifically how Indians responded to British colonialism, which had forced India, as a colony, to fight in the war. My research included secondary sources by modern historians and speeches, letters, and other primary sources by Indians who lived under British colonialism. My research paper argues that Indians developed a wide variety of nationalist movements that signified the diversity of India as a country. These various movements were all bound together by the common goal of independence from British colonial oppression. However, they also greatly ranged from mutually beneficial cooperation with the British, to diplomatic but firm opposition to the British, to actively militant hostility towards the British.

52. The Politics of Cold War Citizenship: A Case Study, Colleen Coyle

Mentor: Sara Egge, history

This project is an exploratory interrogation of how Cold War politics shaped the government's

understanding of citizenship, particularly as it pertains to people with ideological differences. Margaret Randall, a feminist, political activist, and author, was nearly denied her citizenship rights based on her ideological associations with Cuban, Mexican, and Nicaraguan communist thinkers. While Randall eventually won the return of her citizenship status, the state struggled to label her as a defendant of world Communism, and thus under the McCarran-Walter Act, ineligible for citizenship rights. The attempted denial of Randall's citizenship rights based on her ideological positions demonstrates how the state conceptualized a politically active woman as a threat to national security.

53. Comfort Women in East Asia, Sidney Spivey

Mentor: John Harney, history

Japanese colonization in Southeast Asia created a strong dominant/subordinate dichotomy. This developed into a Japanese brand of orientalism and feminized those they colonized, emphasizing the entitlement of the imperial man. This entitlement is exemplified through the institutionalized use of comfort women--women from Southeast Asia who were recruited and sold into sexual slavery. While many women from various Southeast Asian countries were used as comfort women, Korean women were by far more frequently abused. During World War II, these women were the front line of defense for the Japanese Imperial Army, acting as a way to maintain American and Japanese soldiers. This paper will examine comfort women as an imperial tradition of placing Korean women in a cycle of purposeful oppression which stems from Japanese conceptions of gender, sexuality, and race.

54. Juror Bias in High Publicity Murder Cases: Promoting Prospective Juror Honesty, Brenna Olson, Janae McDonald, and Taylor Singleton

Mentor: Mykol Hamilton, psychology

In a study exploring the effectiveness of individual voir dire interviews, we examined the detrimental role of "prehabilitation" in high

pretrial publicity cases. When judges and attorneys, before and during individual voir dire interviews, emphasize the importance of putting aside biasing information and presuming innocence (prehabilitative, leading information), prospective jurors tend to conceal their biases. While the purpose of voir dire is to expose bias, the interests of judges and attorneys may compromise this goal. In reality, voir dire may pressure prospective jurors to conceal rather than reveal bias. When we tested the effects of prehabilitative vs. disclosure-promoting judge statements and attorney questions on prospective jurors' bias disclosure, bias disclosure was higher in the disclosure-promoting condition. Ultimately, this study has the potential to be used to promote the modification of current voir dire techniques for the improvement of juror bias identification.

55. **Breaking the Prejudice Habit: A Longitudinal Assessment of an Intervention to Reduce Implicit Racial Bias**, *Nicole Stumpp and Amy Sekar*

Mentor: Jennifer Goetz, psychology

Racial bias has decreased in outward expression over the years but unconscious, automatic race bias still exists and affects individuals of color in negative ways. We present an initial test of an intervention plan to reduce implicit racial bias. This training teaches participants the origins of automatic race bias, the effects it can have, and strategies aimed at reducing it. Both explicit and implicit measure were utilized in the experimental and the control group over an 8-week span. Through the combination of intervention strategies and personal awareness, we hope to find a long-term reduction in implicit racial biases. Our findings from a pilot study last spring with about 40 participants gave us implications for improving the intervention. The results from the pilot study and Devine (2012) we expected to see a reduction in implicit racial bias after receiving the intervention training program in addition to an increase in concern about discrimination against Black people.

56. **Quantifying Nature: The Relationship between Preference & Fractal Dimensions**, *Marissa Metzger, Cheyenne Bunner, and Ke Li*

Mentor: Aaron Godlaski, psychology and behavioral neuroscience

Fractal dimensions can be found in both natural and urban landscapes. Prior studies indicate that humans respond favorably to a specific range of fractal complexity. This complexity is posited to be related to the evolutionary/adaptive value of a particular environment, however, prior to the use of fractal image analysis, content/context of images had no objectively quantifiable qualities. Previously conducted studies in this area relied on contour-based analysis of fractal dimension of such images however these methods fail to take into account the total complexity of a full-color image and may not be representative of the actual complexity of a given natural scene. An ideal analysis of complexity should involve accounting for as much visual information as possible. The purpose of this study is to explore the relation between self-rated preference for specific scenes and the fractal dimensions of those scenes using a more advanced method of fractal analysis.

57. **Fast Money: The Role of Response Time and Inhibitory Control in Money-Related Decision Games**, *Lena Jewler and Breanna Carter*

Mentor: Aaron Godlaski, psychology and behavioral neuroscience

The ultimatum game is an economic paradigm that is often studied because, contrary to the rational behavior predicted by traditional economic theory, its players often make irrational decisions. One possible means of explaining this behavior is through the concept of inhibitory control. Inhibitory control is an individual's ability to suppress their dominant impulses in order to select more appropriate behavior (Logan, Schachar, & Tannock, 1997). However, there are two competing explanations for the ways in which inhibitory control might explain irrational behavior in the ultimatum game; players' irrational behavior might be due to a lack of inhibitory control, or the inverse,

inhibition of a dominant response. This experiment aims to investigate the relationship between inhibitory control as characterized by cardiovascular physiology, response times, and irrational decisions in the Ultimatum Game in order to develop a clearer understanding of underlying inhibitory mechanisms.

58. **To Concentrate or Devolve: Examining the Efficacy of Regional Governance in Chile and the US through Education Reform**, *Peter O'Donnell*
Mentor: Jennapher Lunde Seefeldt, politics and international studies

In 2017 I spent my summer in two countries examining the efficacy of regional governments in Chile and the United States through education reform. In Chile, the regional government I studied had limited autonomy as they existed in a unitary state. The education reform in Chile was aimed at defunding private schools that were subsidized by the state. In the United States, the regional government has a significant level of autonomy. The education reform in the US was aimed at funding charter schools. I aimed to answer the question about what is perceived as more efficacious: a unitary system of governance or a devolved federal system? I hypothesized that a regional government existing in a federal system would have higher levels of perceived efficacy compared to that existing in a unitary system. The project was conducted through a series of surveys, expert interviews, and field observations. The results led me to conclude that the unitary and federal systems did not differ dramatically.

59. **Cognitive Dislocations and State Behaviors in the Korean Peninsula**, *Bangchen Ruan*
Mentor: Dina Badie, politics and international studies

In early 2016, the South Korean government announced that the Terminal High Altitude Area Defense system (THAAD) missile system would be deployed in the country by the United States to deter North Korean aggression, and this proposal has been fulfilled on April 26th, 2017. This study examines the dynamic of perception

and misperception of the THAAD deployment and discusses its impact on the balance of power in the region. In this study, I argue that the reactions from China and the United States on the deployment of THAAD should be evaluated based on the notion of cognitive dislocation, and such subjective and psychological phenomenon, working alongside with other objective realities, has made the security dilemma in the Peninsula as a self-fulfilling prophecy.

60. **The State of Happiness**, *Siera Hanks*
Mentor: Lori Hartmann, international studies

Development discourse is rife with differing opinions on what can make a territory richer, more efficient, or safer but the impacts these programs have on human wellbeing are deeply understudied and underemphasized. What developmental steps can be taken to make people happy, and most capable of living fulfilling lives? By drawing from my experiences this summer going to two conferences in related fields and spending time in Bhutan, a country famous for its alternative development path based on isolationism and Gross National Happiness or GNH rather than GDP I outline the state of happiness in development discourse. My presentation seeks to synthesize what I learned from my studies and experiences in order to contextualize the position, efficacy, purpose and potential of happiness and wellbeing- focused development tools, models, and matrixes within the broader field of development.

61. **"Corrective Rape": An Unintentional Consequence of the Collapse of Apartheid**, *George Mason*
Mentor: Lori Hartmann, international studies

Although South Africa was the first country to outlaw discrimination on sexual orientation, "corrective rape", a recent phenomenon targeting black, lesbian women to turn them straight, is a recent phenomenon. Apartheid's powerful influence still exists today in the normalization of rape culture and negative attitudes towards homosexuality. This paper argues that the standardization of social

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attitudes during apartheid conflicts with the attempts to promote women's and LGBTI individuals' rights led to "corrective rape". The apartheid system sustained patriarchal ideas of women contributing to the narrative of female rape and the persecution of black women for their race, class, and gender. The inclusion of LGBTI and women's rights with the introduction of democracy narrowed the focus of these previous attitudes to black, lesbian women. Conclusively, the fall of apartheid and sudden rise of democracy was a rushed process that led to unintended consequences such as "corrective rape".

62-66. **SOC 210: Social Welfare Course**

Mentor: Beau Weston, sociology

The SOC 210 "Social Welfare" course has been studying how every family in Boyle County interacts with welfare institutions. We construe welfare broadly, starting with the way our families contribute to most people's flourishing. Each of the five teams of students will present on an aspect of local welfare institutions.

67. Acceleration of AutoDock Vina with Containerization, Mark Hisle

Mentor: David Toth, computer science

In the drug discovery process, millions of molecules are tested with computer simulation, requiring hundreds of thousands of CPU hours. A frequently-used simulator, AutoDock Vina, is available as a precompiled programs and as source code. The precompiled version runs significantly slower than the program does if the code is compiled on the target hardware. However, because AutoDock Vina requires outdated compilers to compile some of the equally outdated libraries it depends upon, it is very difficult to compile. Thus, most users of AutoDock Vina likely run the precompiled version, requiring a great deal of extra computational time to get their results. We attempted to fix this issue by creating a container where AutoDock Vina is easily compiled. We tested our container on San Diego Supercomputer Center's cluster, Comet, and found the version of AutoDock Vina in the container required 33% less time than the precompiled version of AutoDock Vina.

68. Exploring Cost and Energy Efficient Alternatives for Running the GAMESS Computational Chemistry Software, Yin Song

Mentor: David Toth, computer science

We explored the viability of computers with ARM-based CPUs and low-power x64 CPUs for use as a low-energy consumption tool for researchers who run the computational chemistry application GAMESS. We tested different tiny computers with ARM and x64 CPUs to find the most energy efficient and effective system for running GAMESS. Then we built a compute cluster with 24 of the best tiny computers and compared the performance of the cluster to a server with ARM CPUs and two different servers with x64 CPUs. The tests measured the energy consumption and computational throughput of the cluster and the

three servers so comparisons could be made between the different systems.

69. The Effects of Expressive Writing and Positive Psychology on Female Body Image and Well-Being, Sarah Greene and Megan Reid

Mentor: Jan Wertz, psychology

The effects of negative body image and low self-esteem are pervasive throughout our society, particularly among women. As a result, disordered eating behaviors and psychological disorders are appearing more frequently. In an attempt to counter women's negative body image, we reviewed past research on techniques where participants express their emotions through writing. Studies to date have demonstrated benefits of expressive writing in numerous areas. However, there has been no research investigating the potential benefits of improved body image and general psychological well-being. The purpose of this pilot study is to examine the effects of positive psychological writing— about gratitude, kindness, forgiveness, and self-compassion—would positively affect body image and well-being in females. The study found that the experimental group had higher positive affect and lower negative affect, compared to the control, however, it was not significant. Further results will be discussed.

70. Bearing the Stress: Assessment of the Relationship between Hair Cortisol and Fecal Glucocorticoid Metabolite Levels in Bears, Je'Coiya Moore

Mentor: Brent White, psychology

Cortisol is a steroid hormone that is released in response to stressful events. It is important to study cortisol levels in captive and wild animals to determine whether the animals are experiencing unhealthy stressful conditions. In bears, there is little information on how hair cortisol is related to immediate measures of cortisol in blood, urine, or feces. This study addresses this question by correlating eleven collected hair samples with the ten-week history of daily fecal glucocorticoids that preceded the

hair samples. Hair shaft samples were sorted and ground into a powder, from which cortisol was extracted and quantified with an enzyme immune assay (Salimetrics, LLC). Fecal samples were assayed using a radioimmunoassay (MP Biomedicals). Results show significant correlations between hair and fecal samples. We conclude that opportunistically collected hair may reflect physiologically circulating cortisol from five to ten weeks prior to the hair sample.

71. **Product Characterization of the Oxidation of Veratryl Alcohol Catalyzed by an Iron Coordination Complex**, *Emily Brown*
Mentor: Karin Young, chemistry

Lignin is a complex biological polymer that must be decomposed to produce white paper. Enzymes produced by white-rot fungus *P. chrysosporium*, which selectively decomposes lignin, have been a source of inspiration for coordination compounds to oxidize lignin. One such coordination compound is Fe-dpaq where dpaq-H is the ligand 2-[bis(pyridine-2-ylmethyl)]amino-N-quinolin-8-yl-acetamide. Fe-dpaq has been shown to successfully oxidize veratryl alcohol, a lignin model compound, into veratraldehyde. However, in order to evaluate the specificity of Fe-dpaq as a catalyst for this reaction, the other products must be determined. An overview of kinetic and product analysis data will be reported.

72. **Discovery of Novel MurA Inhibitors by Structural-Based Virtual Screening**, *Yuqian Dai*
Mentor: Jennifer Muzyka, chemistry

Due to the overuse and misuse of antibacterial drugs, antibiotic resistance has become one of the most stressing health problems over the world, making once easily treatable disease turn into dangerous infections. In order to identify novel antibacterial drugs, MurA, the enzyme that catalyzes the first committed step in the biosynthesis of peptidoglycan in bacteria cell wall, has been chosen for study, since successful antibiotic targets at enzymes that are critical to bacterial survival but has no human analog. In this study, virtual screening of commercially

available compounds from ZINC has been performed by using DOCK. The docking program DOCK applies geometric algorithms to predict the correct binding mode of small molecules within the active site of MurA. Small molecules with favorable binding energy have the potential to be developed into new drug lead and can undergo further biological assays to test their antibacterial activity.

73. **Design, Synthesis, and Screening of Peptide Inhibitors for the Treatment of Disease**, *James Rose and Adam Clark*
Mentor: Kerry Paumi, chemistry

Metals have important roles in infection and disease progression. Current research focuses on the synthesis, and screening of peptide linked chelating molecules. The peptide linked complexes are designed to utilize the properties of metal-ligand complexes to selectively target and treat disease.

74. **Development of Mithramycin based Anticancer Drug**, *Kate Jenkins*
Mentor: Daniel Scott, chemistry

Mithramycin (MTM) is an anticancer agent that is produced by bacteria of the *Streptomyces* genus. MTM was discovered and used clinically in the 1960's, but is limited by its side-effects. However, by inactivating the last enzyme in the MTM bio-synthetic pathway, the analogues SK, SDK, and SA are produced. SK and SDK show increased activity against cancer cells, but also induce non-specific side effects. MTM SA exhibits decreased activity, but it also contains a unique carboxylic acid. This carboxylic acid will be chemically modified to improve drug functionality. Before modifying MTM SA, it must be isolated. *Streptomyces argillaceus* M7W1 is grown, on solid media, then liquid media, to produce all of the analogues. MTM SA is then isolated by C18 and anion exchange columns. Once pure, the terminal carboxylic acid of MTM SA 3-side chain will be modified with different compounds in hope of improving its activity against cancer while decreasing the non-specific side effects.

75. Microbial Communities in Potable Ethanol,
Chloe Grove and Liza Goss

Mentor: January Haile, chemistry and
biochemistry & molecular biology

The microbial communities in mash samples from bourbon distilleries were analyzed to identify the source of the bacterial contamination. Samples at various stages of fermentation were evaluated. Bacteria cultures were grown and isolated from these samples. Cultures were categorized by their morphology and by Gram staining. Comparing microbial communities between distilleries and at various stages will provide insight into the source of the microbial contamination in the mash.

76. Internship at Ferm Solutions, Drew Howard

Mentor: January Haile, chemistry and
biochemistry & molecular biology

In the alcoholic beverage industry, yeast does most of the work, converting sugars into ethanol. Existing unavoidably alongside yeast are bacteria, which can have positive or negative effects depending on what the brewer wants, where, and when they grow. Wilderness Trail Distillery/Ferm Solutions is a Danville-based distiller which focuses on both the business and biochemistry of a distillery, offering specialized yeast strains, enzymes, antimicrobials, other lab services, and bourbon. My internship there as a lab assistant involved the culturing, isolation, characterization, and preservation of bacteria from samples at points in the fermentation process from mash to just before distillation, including water. This sample set was repeated for multiple fermenters both at Wilderness Trail and other participating distilleries. The bacterial isolates will be identified by genetic sequencing, screened for antimicrobial resistance, and could be used for further investigations in the future.

77. Retinol Esterification in *Homarus americanus*,
Casey Thompson

Mentor: Stephanie Dew, biology and
biochemistry & molecular biology

Vitamin A—retinol—studies within invertebrates is lacking, meaning that the uptake, storage, and usage remains understudied. In this study, retinol esterification is examined in the lobster species *Homarus americanus*. To measure esterification, tritiated retinol was prepared and used as the only retinol source within each assay, and myristoyl CoA was the acyl source.

Hepatopancreatic microsomes were extracted via centrifugation from lobsters to be used as the source of enzyme, and BCA assays were used to determine microsome concentration. A scintillation counter was used to determine the radioactivity in counts per minute (CPM) for each assay after separating the retinyl ester from the unreacted retinol using alumina columns. The high CPM counts allow for the conclusion that there is an enzyme esterifying the tritiated retinol within each test, and the knowledge from other research suggests that enzyme is ARAT. However, further testing is required to confirm ARAT's presence.

78. Isolating and Characterizing the Dadosky Bacteriophage, Benjamin Hammond

Mentor: Marie Nydam, biology

Bacteriophages are a type of virus that bind to bacterial cells and use the bacteria's DNA to make copies of themselves. First a soil sample from St. Petersburg, Florida was enriched, the phage was isolated, cultured, and purified, creating a High Titer Lysate (HTL). The isolated bacteriophage was named Dadosky. The experiment then investigated the phenotype and genotype of the Dadosky bacteriophage. A sample of HTL was put through DNA isolation to gain a concentrated sample of DNA. Further study with enzyme digests from the DNA isolation will help characterize the genome of the bacteriophage. Also, a HTL sample was viewed in a Transmission Electron Microscope (TEM) to determine the phenotype of the phage. Comparing pictures and measurements from the TEM with known phages will help characterize in which phylogenetic group the Dadosky bacteriophage falls. Once its genome is classified and phenotype identified potential uses for Dadosky can be investigated.

79. River18—A Novel Bacteriophage Isolated from Soil in Centre College, Liu Jiang

Mentor: Marie Nydam, biology

Bacteriophages, also known as phages, are a group of viruses that use bacteria as hosts. This project aims to isolate, purify and analyze a new bacteriophage from the environment. Bacteriophages that specifically infect *Mycobacterium smegmatis* mc²155 were selected. One single phage species was isolated, purified and amplified from a soil sample collected from the campus of Centre College. Then its DNA was isolated from the amplified samples. The purified bacteriophage, River18, was observed under a transmission electron microscope (TEM) and its DNA was digested with eight restriction enzymes. Morphology of River18 using TEM was a sticky capsid, the head, connected to a long and smooth tail with no ring-like structures twining round the tail. Analysis of the restriction digest results is in progress and the future plan is to sequence and characterize River18's genome.

80. Isolation and classification of *Mycobacterium smegmatis* bacteriophages from a Medium Titer lysate, Iona Palmer and Noah Gillis

Mentor: Marie Nydam, biology

The goal of this project is to purify and amplify a novel bacteriophage from my colleague Noah Gillis's formerly-prepared medium titer lysate (MTL) phage solution. The solution was originally believed to have contained only one phage type. However, after plating a phage-infected *M. smegmatis* culture, the presence of several different types of viruses within the solution was suggested. I am currently attempting the plaque streak method in an effort to isolate each individual plaque-causing virus from the others. Results from the plating of the MTL solution and phage observations via transmission electron microscopy provide strong evidence that there are at least three phage types within the solution. Each distinct phage yields unique plaque characteristics, ranging in size, apparent strength, and turbidity. Future plans include

continuing the streaking method with several plaques of varying morphologies in an attempt to isolate two or more phage types, and preparing high titer lysates.

81. Novel Antibiotic Identification, Dana Pencil and Gentry Brown

Mentor: Peggy Richey, biology and biochemistry & molecular biology

Numerous antibiotics target enzymes involved in bacterial cell wall peptidoglycan synthesis because this pathway is unique to all bacteria. MurA is a commonly targeted enzyme, as it catalyzes the peptidoglycan synthesis pathway. Currently, fosfomycin is the only antibiotic used to inactivate MurA; however, antimicrobial resistance is reducing fosfomycin's effectiveness. Therefore, the goal of this project is to test the inhibitory effect of putative MurA inhibitor, LT040, in effort to reduce the usage of fosfomycin. The MIC of the antibiotics was determined by conducting microtiter assays on *Escherichia coli* and *Staphylococcus aureus*. *E. coli* has a MIC with fosfomycin alone at 128 µg/ml and this decreased when used in combination with LT040. *S. aureus* has a MIC with fosfomycin alone at 64 µg/ml and decreased when used in combination with LT040. Our results suggest that LT040 is a compound that could reduce the amount of fosfomycin needed to inhibit bacterial growth.

82. Assessing the Impacts of Herbivory on Running Buffalo Clover (*Trifolium stoloniferum*), Timothy Grabenstein

Mentor: Matthew Klooster, biology

Running Buffalo Clover (*Trifolium stoloniferum*) is a federally endangered plant species that is currently being reintroduced to portions of Central Kentucky. Running Buffalo Clover is a perennial species that is a poor competitor, requires seed scarification, and lacks nitrogen fixing root nodules commonly found with clover species. Because of these traits, Running Buffalo Clover relies on disturbance to help with the removal of competition, facilitation of seed scarification, and nitrogen supplementation. This

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research looks to observe how herbivory could impact the survival and growth rate of clover populations. This study takes place in Shaker Village on an existing population of RBC of varying ages. The goal of this experiment is to assess the potential impact of herbivory from mega fauna, and macroinvertebrates. Our hypothesis is that reintroduction failures could be in part due to not understanding the impacts of herbivory on population growth and survival.

83. The Effect of Drying Period on Psephenus herricki in Kentucky Freshwater Streams,

Hannah Hamlin

Mentor: Mark Galatowitsch, biology

Climate change is causing unpredictable drying patterns in freshwater streams affecting stream biodiversity with some species being more tolerant to drying, while others are not. Water penny beetle larvae (*Psephenus herricki*) are common in perennial and intermittent Kentucky streams and may have strategies to resist desiccation. We used these aquatic larvae in a laboratory experiment to determine how they respond to drying stress. We tested their response to different drying periods (4, 8, 16, and 32 days) in artificial stream mesocosms. We found that the water penny larvae have higher mortality when exposed to longer dry periods. Yet, up to 40% were able to survive 32 days without water. These results suggest that water penny larvae not only withstand short-term drying, but are likely adapted to withstand long periods of desiccation. Understanding how resilient aquatic invertebrates are to stream drying can be important for predicting how climate change could impact stream communities.

84. Basketball Shot Chart Visualization Tool,

Rao Fu

Mentor: Jeffrey Heath, mathematics

We developed an interactive basketball shot chart visualization tool in R that allows users to spatially visualize the shooting trends of individual players and compare them to league averages. The tool has the flexibility to visualize

all shots in a variety of formats including hexagonal charts, scatter plots and heat maps. Data was extracted from www.espn.com using Python.

85. Comparing Education Systems in France, Germany, and the United States,

Manasaa Kannan and Stephanie Keller

Mentor: Joel Kilty, mathematics

The Organization of Economic Co-operation and Development (OECD) produced a report, 'Universal Basic Skills: What Countries Stand to Gain', ranking 76 countries according to performance of students on math and science tests. In this list, Germany is ranked 13th, France is ranked 23rd, and the United States follows closely at 29th. By understanding the differences among these education systems, we can attempt to justify which qualities of an education system provide a higher ranking and citizens with a healthier preparation to enter the workforce. With this goal in mind, we visited universities in each of these countries and engaged with students and administrators to better understand the structural differences between the education systems and the people's perception of their respective educations. We found sharp distinctions in the structure of the systems and in educational philosophies, but a common theme of job preparedness resulting in an attitude of respect towards all jobs.

86. Community-Based Learning: Measuring the Student Experience,

Jimmy Robinson

Mentor: Ellen Prusinski, education

At Centre College, many professors have incorporated Community-Based Learning components in their courses. Community-Based Learning (CBL) is a pedagogical approach that intentionally links what is being taught in the classroom to the surrounding communities. CBL is grounded in mutual respect and belief that all communities have educational assets and resources that can enhance learning experiences for students. This presentation provides a picture of Centre students' experiences, beliefs about, and learning through CBL courses. The data on

which this presentation is based come from three sources: a survey given to all Bonner students in fall 2017 and student self-assessments completed by students in CBL courses in fall 2016, and fall 2017. I will be focusing on these findings within the broader context of my experience as the CBL intern at Centre's Center for Teaching and Learning.

87. A Place of Connection: The Warehouse, Hemp, and the Railroad, Rebekah Bruner

Mentor: Sara Egge, history

This research studied the role of the Comb's Warehouse in Danville throughout the early 20th century. The Warehouse played a pivotal role in the commoditization of hemp within Boyle County, one of the largest producers of hemp within the United States. This research reveals the importance of place in the development and impact of the Warehouse. Its close proximity to the railroad tracks allowed the hemp of Boyle County to reach all corners of the United States, and even aid in war efforts. This project also traces the decline of hemp, and what this meant for the farmers of hemp and the owners of the Warehouse.

88. The Centre College Warehouse: Where Societies Collide, Noah Martin

Mentor: Sara Egge, history

Before it was the Combs Center, the Centre College Warehouse served a century's worth of other purposes. Upon its construction in the early twentieth century, it provided a space for local hemp and grain operations. Additionally, from its position on the doorstep of Danville's rail depot, the Warehouse acted as one of several markers of the town's vibrant commerce. At various periods, it accommodated auctions, a furniture retailer, and, for a small window of time, even a night club. In its many functions, the Warehouse has been a structure around which individuals of different classes, races, and origins have entered into community. Indeed, for much of its history, it lay within a forum of cultural collision, as travelers and locals, men and women, blue-collar laborers and white-collar workers entered into exchange.

89. Green vs. Growth: The Development of Zoo Atlanta, Emma Presberg

Mentor: Sara Egge, history

In 1889, a traveling circus was abandoned near Atlanta due to a lack of funds and from this Zoo Atlanta was born. The zoo was placed in Grant Park and through various donations over the years, the Atlanta Zoo grew to the top zoo it is today. However, this was not without periods of struggle and at one point the zoo was in threat of being shut down. The zoo was reborn with a message of conservation and animal welfare. However, as the popularity and size of the zoo grew, the city of Atlanta took land away from Grant Park and removed trees and green space to build zoo enclosures. With zoos receiving criticism for not being large proprietors of the conservation movement, examining how natural space changed as the goals of the zoo shifted shows an example of how zoos impact the conservation movement.

90. The Flame Run: A Greater Historical Narrative, Hibah Siddiqui

Mentor: Sara Egge, history

I am exploring the sociocultural context that led to the Flame Run by focusing on the history of the statue, particularly why its location was chosen and how its meaning has changed since 1969. Furthermore, I am researching the trend of streaking across college campuses in the 1970s, which followed the Second Sexual Revolution in the United States. I am connecting the broader US movement of streaking to Centre and answering why the Flame in particular was chosen as the centerpiece for Centre's streaking tradition—what understanding of the Flame statue led students to start this tradition? I argue that the freedom that arises from streaking is heightened because the run occurs in such close proximity to the academic buildings—a representation of the core cause of stress for Centre students. The Flame Run ultimately functions as an act of resistance to the unending stress Centre students face because of academics.

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91. **Working from Home and “Having it All”: How Professional Women Navigate Work-Life Balance**, *Cara Barnett*

Mentor: Robyn Cutright, anthropology

Telecommuting can be defined as working from home while making use of the Internet, email, telephone, and other social media. In 1983, the San Joe Mercury News company stated that "Home computers are nurturing working mothers". Yet, Dr. Ruth Schwartz Cowan an American historian of technology, refutes this statement in her book *More Work for Mother* (1983) stating that technological innovations have actually resulted in women doing more work overall. Do these statements still hold true today? This study will analyze differences in work-home balance (perceived flexibility, amount of personal/family time, perceived success, and perceived happiness) observed through interviews and surveys. This research project proposes to study the experiences of professional women working from home; including how they describe their work-life balance and what this means to them.

92. **Late Iron Age British Households within Roman Occupied Britain**, *Catherine Doubles*

Mentor: Robyn Cutright, anthropology

My RICE presentation will be the culmination of my Senior Seminar research exploring the continuity of Late Iron Age British culture under Roman occupation. A lot of the current research focuses on the Roman Empire and the social and economic changes that were brought to the indigenous people of Britain through trade, direct military control and colonial influence. My area of focus will be the settlement patterns and the households themselves as I investigate the use of spaces within the Late Iron Age British household and how people continued to move throughout their home spaces during the time of Roman Conquest. The objective for my project is to explore whether, how, and under what conditions British communities continued to replicate earlier Late Iron Age British culture within the home under the heavy influence of

Roman military campaigns and the influx of Roman settlers and imports to the island.

93. **Identity and Acculturation in Boyle County: Mexican/Guatemalan Immigrants Discuss their Experience**, *Jailene Paz*

Mentor: Robyn Cutright, anthropology

The discourse on how acculturation and identity interact is understudied. In their article "The Role of Identity in Acculturation among Immigrant People: Theoretical Propositions, Empirical Questions, and Applied Recommendations" Schwartz, Montgomery, and Briones argue that "acculturation represents changes in cultural identity and that personal identity has the potential to 'anchor' immigrant people during their transition to a new society." I will conduct 6 in-depth interviews in order to gauge how individual perceive their effect/their culture's effect on their community, and how they perceive their lives being affected by U.S. culture. In the current context of the U.S. and its immigration laws, there is animosity towards immigrants in general. Contributing to a space where latinx can share their experiences can continue to expand conversations about identity development in the latinx community.

94. **Food Deserts in Central Kentucky**, *Nicholas Ngong and Rebekah Bruner*

Mentor: Brett Werner, environmental studies

This RICE poster will be an extension of the oral presentation done by Beka Bruner, my co-researcher over the fall. It will focus on our research into food deserts in Central Kentucky, and will focus on the responses to a survey we sent out about the eating habits of those who live in both Boyle and Washington counties. We'll explain our interest in researching this topic and then share our analysis of the data. Ideas we explore in the survey include race and socioeconomic class and how people from different demographics think about what makes different kinds of food "fresh" or "healthy". We will then connect this information to the realities of what food is actually available in these counties, and question how accessible healthy

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food is in this area, in terms of both finances and distance from a grocer. We learn that there isn't a clear idea of what fresh or healthy food is among the community we surveyed, and sometimes food isn't a priority when other bills have to be paid.

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