

Program and Abstracts
Celebration of
Student Scholarship



**Showcase of Student Research,
Scholarship, Creative Work,
and Performance Arts**

April 25, 2018

Let the world
hear about your
experiences at the
**2018 Celebration of
Student Scholarship**
on social media –
#MuchMoreScholarship
@moreheadstate



2018 Celebration of Student Scholarship

People's Choice Award – Oral Presentation

Although most awards at the Celebration are decided by faculty /staff judges in accordance with an official judging rubric, the Peoples' Choice Award is chosen by the vote of all participants (students, faculty, staff and visitors) on the basis of perceived scholarly impact & overall quality of presentation.

I vote for ***oral presentation*** # ***CS*** - _____

Your vote must be submitted at the Athena Room registration desk by 1:15PM to be counted!

Tear Here



2018 Celebration of Student Scholarship

People's Choice Award – Poster Presentation

Although most awards at the Celebration are decided by faculty /staff judges in accordance with an official judging rubric, the Peoples' Choice Award is chosen by the vote of all participants (students, faculty, staff and visitors) on the basis of perceived scholarly impact & overall quality of presentation.

I vote for ***poster*** # ***P*** - _____

Your vote must be submitted at the Button Drill Room registration desk by 2:30 PM to be counted!

2018 Winner
31st Annual A. Frank and Bethel C. Gallaher
Performance Competition

Summer Lighthall

Into the Night

Clara Edwards (1880-1974)

Si mes vers avaient des ailes

Reynaldo Hahn (1874-1947)

Mein Herr Marquis from Die Fledermaus

Johann Strauss, Jr. (1825-1899)

Summer Lighthall, soprano

Will Murphy, piano

A junior at Morehead State University majoring in music education with a focus in voice. She has loved music for as long as she can remember, it has been a passion and joy for many years. Her family has given her nothing but love and support over the years and they are all incredibly important to her. She says that they have taught her that there is never a reason to be unkind to another person and that love goes a long way. She is extremely grateful for the wonderful opportunities and support given to her by the faculty and staff of MSU.



**MOREHEAD STATE
UNIVERSITY**

CAREER SERVICES

PRESENTED BY:

Josh Taylor
Internship Coordinator
& Career Advisor

CAREER SERVICES EXPERIENTIAL EDUCATION AWARDS

Each year, Morehead State University's Career Services honors an employer, a student, and a faculty member whose contributions to and investments in career development via experiential education are truly exemplary. Career Services works to connect students with employers to gain professional experience before graduation in order to be competitive in today's global market. Experiential education fosters career preparation and skill application outside the classroom. All students, employers, and faculty engaged in internships, co-ops, student teaching experiences, practicums or clinicals during 2017 were eligible for nomination.

We're pleased to recognize the following individuals for their collective efforts and achievements in student career development.

INTERN OF THE YEAR VICTORIA PANG

The Morehead State University 2017 Student Intern of the Year Award is granted to Victoria Pang, a graduate student in the Department of Engineering and Technology Management. Victoria's supervisor touted her "hardworking, forward thinking, and organized" traits when nominating her. As an intern, her work with the Regal Quality Team focused around continuous improvement of production efficiency. Victoria was critical in helping the quality team achieve the Compass Star 1 certification for the Morehead facility. She holds a Master's Degree in Social Science from Morehead State (2016) and a Bachelor's Degree in Journalism and Media Communication from Tianjin Normal University, in China. She will graduate with a Master's in Engineering and Technology Management in May 2018.

INTERNSHIP EMPLOYER OF THE YEAR REGAL BELOIT

The Morehead State University 2017 Internship Employer of the Year Award is granted to Regal Beloit, a leading manufacturer of electric motors, mechanical and electrical motion controls, and power generation products serving markets throughout the world. Regal's senior management team at the Morehead facility continues to provide mentorship to interns as they combine classroom knowledge with field application through projects vital to the organization. Success is a team effort, and Regal's Employer of the Year Award recognizes Plant Manager, Randy Norwood; Randy Bumgardner, Manufacturing Manager; Ernie Robinson, Quality/Lean Coordinator and Intern Supervisor; Caleb Grimes, Manufacturing Engineer II.

FACULTY SUPERVISOR OF THE YEAR DR. GREGORY RUSSELL

The Morehead State University 2017 Faculty Supervisor of the Year Award is granted to Dr. Gregory Russell, for dedication in assisting students learn about, secure, and complete experiential education opportunities in a range of fields within the School of Business Administration. Regarding the impact of internships on student success, Dr. Russell reflects: "These internship experiences vary widely, from large firms with billions of dollars in sales to small companies with only a few employees, but share a common thread of providing students with opportunities to gain tremendously valuable experience and learn about how actual businesses operate. And those experiences translate to great employment opportunities and career advancement." Dr. Russell serves as the Interim Dean, with teaching interests in operations management, quality management, and quantitative methods. He holds a B.S. in Mechanical Engineering from the University of Kentucky, an MBA from the University of Kentucky, and a Ph.D in Operations Management from the University of South Carolina.

Celebration of Student Scholarship

April 25, 2018

Program Overview

Camden-Carroll Library and Button Auditorium

7:45 – 8:30 am

All student scholars and faculty mentors are to register and pick up programs and name badges (2nd floor Camden-Carroll Library), Posters should be set-up at this time and PowerPoints loaded.

8:30 – 10:15 am

Oral Presentations at Camden-Carroll Library (2nd Floor Commons, Classroom 201, Learning Resource Center 1st Floor, 1st Floor Commons, 4th Floor Tower, 5th Floor Tower and Seminar Room A, Room 306)

10:15 – 10:30 am

Break

10:30 – 11:45 am

Oral Presentations (Camden-Carroll Library)

11:45 – 12:00 pm

Break

12:00 – 1:15 pm

Oral Presentations (Camden-Carroll Library)

1:15 – 3:00 pm

Poster Presentations (Button Drill Room)
(posters left up until 5:00 pm)

3:00 – 4:00 pm

Reception (Button Drill Room)

4:00 – 4:15 pm

Gallaher Memorial Music Performance (Button Auditorium)

4:15 – 5:00 pm

Awards (Button Auditorium)

5:00 pm

Removal of Posters

Special Recognition.....2

Posters-at-the-Capitol Participants.....3

Welcome Statements.....4

Jay Morgan, President

Steven Ralston, Provost and Vice President for Academic Affairs

Michael Henson, Associate Vice President for Research and Dean of the Graduate School

Robert Albert, Dean, College of Business and Technology

Chris Miller, Dean, College of Education

John Ernest, Dean, Caudill College of Arts, Humanities and Social Sciences

Wayne C. Miller, Dean, College of Science

Oral Presentation Abstracts.....6

Poster Presentation Abstracts.....36

Recipients of Undergraduate Research Fellowships 2017-18.....77

Student Index 81

Table of Contents

Special Thank You to the Following:

Office of the President

Division of Academic Affairs/Office of the Provost

Document Services/Camden-Carroll Library

<i>Ray Bailey</i>	<i>Sean Johnson</i>	<i>Doug Snedegar</i>
<i>Michael Bramel</i>	<i>Sarah Mollette</i>	<i>Rodney Watkins</i>
<i>Jeff Bryant</i>	<i>Joe Schubert</i>	

Research and Sponsored Programs and the Graduate School

<i>Becki Alfrey</i>	<i>Brenda DeHart</i>	<i>Gera Jones</i>
<i>Darlene Allen</i>	<i>Michelle Emrick</i>	<i>Krys Lynam</i>
<i>Janet Cline</i>	<i>Ollie Floyd</i>	<i>Susan Maxey</i>

Celebration of Student Scholarship Committee

<i>Jennifer Carter</i>	<i>Gina Gonzalez</i>	<i>Chris Miller</i>
<i>Steve Chen</i>	<i>Timothy Hare</i>	<i>Allen Risk</i>
<i>Janet Cline</i>	<i>Michael Henson</i>	<i>Edna Schack</i>
<i>Laurie Couch</i>	<i>Philip Krummrich</i>	<i>Fujian Tan</i>

Concurrent Session Moderators

<i>Robert Albert</i>	<i>Chris Miller</i>
<i>Darlene Allen</i>	<i>Wayne Miller</i>
<i>John Ernst</i>	<i>Dianna Murphy</i>
<i>William Green</i>	<i>Jeanne Petsch</i>
<i>Susan Maxey</i>	<i>Ahmad Zargari</i>

Judges

<i>Robert Albert</i>	<i>Julia Finch</i>	<i>Shari Kidwell</i>	<i>Daryl Privott</i>
<i>Larry Albert</i>	<i>Ollie Floyd</i>	<i>Philip Krummrich</i>	<i>Clarissa Purnell</i>
<i>Darlene Allen</i>	<i>Sahar Ghanem</i>	<i>Lesia Lennex</i>	<i>Garrick Ratliff</i>
<i>Max Ammons</i>	<i>Ashley Gibson</i>	<i>Jennifer Little</i>	<i>Jill Ratliff</i>
<i>Elizabeth Ash</i>	<i>Wretha Goodpaster</i>	<i>Russ Mast</i>	<i>Greg Russell</i>
<i>Ray Bailey</i>	<i>William Green</i>	<i>James Masterson</i>	<i>Edna Schack</i>
<i>Lindsey Barrett</i>	<i>David Gregory</i>	<i>Susan Maxey</i>	<i>Alana Scott</i>
<i>Bernadette Barton</i>	<i>Bill Grise</i>	<i>Michelle McClave</i>	<i>Mee Shon</i>
<i>Chris Beckham</i>	<i>Dirk Grupe</i>	<i>Troy Meadows</i>	<i>Shane Shope</i>
<i>Megan Boone</i>	<i>Connie Hardesty</i>	<i>April Miller</i>	<i>Delar Singh</i>
<i>Katy Carlson</i>	<i>Timothy Hare</i>	<i>Chris Miller</i>	<i>Samuel Stapleton</i>
<i>Jen Carter</i>	<i>Shannon Harr</i>	<i>Wayne Miller</i>	<i>Joyce Stubbs</i>
<i>Doug Chatham</i>	<i>Flint Harrelson</i>	<i>Sarah Mollette</i>	<i>Sherry Stultz</i>
<i>Steve Chen</i>	<i>Virginia Karen Hatfield</i>	<i>Dianna Murphy</i>	<i>Fujian Tan</i>
<i>Carol Christian</i>	<i>Latonya Hesterberg</i>	<i>Lee Nabb</i>	<i>Tim Thornberry</i>
<i>Christina Conroy</i>	<i>Jeffrey Hill</i>	<i>Johnathan Nelson</i>	<i>Elena Volovich</i>
<i>Marcia Cooper</i>	<i>Shana Hogge</i>	<i>Kim Nettleton</i>	<i>Tom Williams</i>
<i>Greg Corso</i>	<i>Jason Holcomb</i>	<i>Jen O'Keefe</i>	<i>Tania Zambrano</i>
<i>Laurie Couch</i>	<i>Jami Hornbuckle</i>	<i>Nancy O'Neil</i>	<i>Ahmad Zargari</i>
<i>John Curry</i>	<i>Lloyd Jaisingh</i>	<i>Helen Otterson</i>	
<i>Nathan Dishman</i>	<i>Kouroush Jenab</i>	<i>Michelle Paise</i>	
<i>Claudette Edie</i>	<i>Eric Jerde</i>	<i>Tom Pannuti</i>	
<i>David Eisenhour</i>	<i>Gera Jones</i>	<i>Jeanne Petsch</i>	
<i>Heba Elgazzar</i>	<i>Jeannie Justice</i>	<i>Jonathan Pidluzny</i>	
<i>John Ernst</i>	<i>Michael Kessinger</i>	<i>David Potter</i>	

2018 Posters-at-the-Capitol Participants

Posters-at-the-Capitol, an annual event collaboratively hosted in Frankfort by all of Kentucky's public institutions of higher learning, enables members of the legislature and the Governor to better understand the importance of involving undergraduates in research, scholarship, and creative endeavor. The following Morehead State University students are recognized as official 2018 participants.

Callie Arnold - Mentor Michael Fultz
Cameron Arthur - Mentor Connie Grimes
Joseph M. Ball - Mentor Sarah Lindsey
Aubrey L. Bennett - Mentor Wesley White
Alexandria B. Cantrell - Mentor Wesley White
Gregory K. Carter - Mentor Wesley White
Samuel L. Case - Mentor Wesley White
Joe Castle - Mentor Katy Carlson
Andrew Cooper - Mentor Shahrokh Sani
Zachary Coots - Mentor Gary O'Dell
Torianne A. Crouch - Mentor Katy Carlson
Austin Curnutte – Mentor Christina Conroy
Cole S. Danzer - Mentor Carol Christian
Justin M. Elswick - Mentors Lesia Lennex and April Reefer
Katie L. Everman - Mentor Wesley White
Cassie Gibson - Mentor Lori Baruth
Danielle Gibson – Mentor Michael Fultz
Mariah Hall - Mentor Connie Grimes
Cody J. Mitchell - Mentor Shahrokh Sani
Kelsey Purdum - Mentor Kimberlee Sharp
Elizabeth VonMann - Mentor Kristina DuRocher
Kaylee M. Whitenack - Mentor Michael Fultz
Austin Wood - Mentor Michele Paise

*For more information on the 2018 Posters-at-the-Capitol please go to:
<http://digitalcommons.murraystate.edu/postersatthecapitol/2018/>*



Our vision is for Morehead State University to be universally recognized for teaching and scholarship of the highest quality resulting in superior student success. To ensure the optimal environment for learning, Morehead State University has a long tradition of combining great teaching with success in scholarship and creative productions. Our academic programs provide a wealth of opportunities for students to work alongside experienced faculty in meaningful research and creative initiatives that stretch our students' intellectual horizons.

The faculty member who mentors students in research and other creative activities provides the stimulus that challenges imaginative minds often in new and innovative ways that would be impossible within the confines of the conventional classroom. Our deep commitment to a culture of undergraduate research results in a rich educational experience for our students and empowers our diverse population of scholars to reach their educational goals.

The Annual Celebration provides a welcome opportunity for everyone to see the products of these unique intellectual partnerships -- products that are remarkable in their originality, scope, and depth. As you review the Celebration of Student Scholarship program, you will discover a wide range of student accomplishments in individual and group research projects, creative efforts, and artistic performances across all academic disciplines.

When considering the accomplishments on display at this year's Celebration, I am confident that through the continued efforts of all those involved, our University will establish itself as a primary destination for students who wish to become both active partners in the process of discovery and exceptional citizens of our increasingly challenging world.

Now in its thirteenth year, our Annual Celebration of Student Scholarship is a time when we can all pause to reflect on the outstanding efforts of this community of scholars and to recognize the tremendous efforts of our students in research, scholarship and creative productions.

I encourage you to attend this showcase and provide your support and encouragement to our young scholars and artists, as well as to the members of our faculty and staff who have shared of their time and talent to help their students bring these projects to reality. Thank you for your participation!

Dr. Joseph A. (Jay) Morgan, President

I am pleased to be a part of the Celebration of Student Scholarship as we recognize the outstanding scholarly accomplishments of our students and their faculty mentors. Across the academy, the primary setting for teaching and learning centers around the curriculum and student engagement as related to structured classroom activities; however, it is the participation in research and creative production activities that provides an opportunity for students to transition from learner to scholar. Student engagement through inquiry that involves seeking answers to research questions or creative expression based on theories and principles provides the learner a different approach and perspective to learning.

"Out of class" experience provided by their faculty mentors have opened doors to new learning opportunities for students as they discover the depth of their own abilities through the application and investigation of knowledge. Partnering with their faculty mentor(s), students are challenged to seek answers to questions through inquiry or apply their creative skills and talents that stretch their base knowledge and compliment their learning opportunities.

This Annual Celebration is an excellent illustration of the integration of scholarship, teaching, and learning. A special "Thank You!" to faculty mentors for their contributions to the intellectual and creative development of our students. "Congratulations" to all of our student scholars for their continued success.

Dr. Steven Ralston, Provost and Vice President for Academic Affairs





The Twelfth Annual Celebration of Student Scholarship spotlights Morehead State University as a premiere destination for all who desire a world-class education that is catalyzed by the personal mentorship of a world-class faculty. It is well accepted in academic circles that involvement in research and creative endeavor empowers students at both undergraduate and graduate levels to better analyze problems and synthesize solutions, thus helping them to better prepare for productive careers and leadership in their chosen fields, as well as to be well-informed, enthusiastic contributors to a progressive 21st century society. My congratulations and my thanks to our students and faculty for recognizing these facts and for their much-valued participation.

Dr. Michael Henson, Associate Vice President for Research and Dean of the Graduate School

The Celebration of Student Scholarship is the capstone event that recognizes the important contributions of faculty and student collaborative research to the overall education of our students at Morehead State University. Our faculty and students alike benefit tremendously from these one-on-one teaching and learning experiences.

Dr. Robert Albert, Dean, College of Business and Technology



The annual Celebration of Student Scholarship has provided a consistent high quality experience for students to share their research related to P-12 education and helps to prepare students for better understanding of data-driven decision making. The research P-12 education students are conducting helps to better respond to local, state, and national trends related to research-based and theory-grounded practice. The scholarship these candidates are presenting demonstrate the lessons learned in the classroom and beyond as part of the skills of professional educations. The College of Education faculty and staff congratulate the students participating in the celebration as their projects showcase the high quality of inquiry vital to teaching and learning within teacher education.

Dr. Christopher Miller, Dean, College of Education

The Caudill College of Arts, Humanities and Social Sciences is committed to providing research and creative production opportunities for students in each of our disciplines. Scholarly engagement and creative endeavors bring students and faculty together as partners and provide advanced learning experiences for both. We are delighted to recognize these outstanding scholars and their mentors who make significant contributions to the campus, state and region. Morehead State University's commitment to academic excellence and the advancement of Kentucky is evidenced by the exceptional work showcased at the Celebration of Student Scholarship.



Dr. John Ernst, Dean, Caudill College of Arts, Humanities, and Social Sciences



The Celebration of Student Scholarship provides a wonderful opportunity to recognize and celebrate student scholarship and creative accomplishments. The relationship among faculty mentors and student scholars is enhanced when they work together to discover and disseminate new knowledge or express themselves through various forms of creativity. Student research and creative activity is an essential component of undergraduate education. Students working with faculty in scholarly activities not only experience the excitement of discovering new knowledge and solving challenging problems, but also learn important life skills that are necessary to thrive today's ever-changing world.

Dr. Wayne C. Miller, Dean, College of Science

Celebration of Student Scholarship

**Camden-Carroll Library
Morehead State University**

April 25, 2018

Concurrent Session – Seminar Room A Room 306

Moderator: Dr. William Green

8:30 – 8:45 a.m. Human rights violations of Canadian mining companies in Latin America: Hard problems and easy solutions

CS - 01

****Aaron Curnutte, Dr. William Green, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

In developing countries regulatory mechanisms are weak, corrupt, and sometimes non-existent. Over half of the world's mining companies which are headquartered in Canada, have an extensive record of recklessly violating human rights. Nowhere is this more apparent than in Latin American where human rights abuses have been linked to Canadian-owned companies operating in fourteen countries. These Canadian mining projects often occur in rural areas with large indigenous populations. These corporate human rights abuses have not gone unnoticed by the Canadian government which convened a National Roundtable on Corporate Social Responsibility in 2006, but the Harper government disregarded its recommendations and created the Office of the Extractor Sector of Social Responsibility Counsellor, but its role is restricted to merely promoting good practices. The research for this presentation was conducted in Ottawa, Canada, during my participation in the Summer 2017 Canadian Parliamentary Internship Program.

8:45 – 9:00 a.m. Canada-Israel strategic partnership memorandum of understanding: Diplomatic, economic, defense, and security issues

CS - 02

****Sarah Fink, Dr. William Green, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

Canada and Israel established diplomatic relations in 1949 based on Canada's commitment to Israel's right to live in peace and to be secure from external threats. Their relationship was further defined by a series of agreements and treaties, including the Canada-Israel Free Trade Agreement (CIFTA) of 1996 which tripled two-way trade, focused on specific sectors of the economy, including science and technology, and encouraged trade agreements between Israel and Canadian provinces. The 2014 Canada-Israel Strategic Partnership Memorandum of Understanding extended and deepened their ties by addressing the three subjects: stable diplomatic relations, including people-to-people ties between the two nations, the extension of CIFTA's policies of eliminating tariffs and customs duties, and the strengthening of the security and defense relations in terms of public safety, cyber security, and counter-terrorism technology. The research for this presentation was conducted in Ottawa, Canada, during my participation in the Summer 2017 Canadian Parliamentary Internship Program.

9:00 – 9:15 a.m.

Canada, environmental sustainability, and clean energy policy

CS = 03

****Andrew Hayes, Dr. William Green, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

The Government of Canada is committed to green mining and green energy production. These initiatives will change the economic structure of Canada's domestic economy and its trade relations which means that the government will have to weigh the costs and benefits of these changes on its industries and foreign markets. The government has already initiated a green mining initiative to create a sustainable country, but this task will require that it assess the overall damage caused by industries and to mitigate their impact on climate change and then to foster the development of renewable energy sources which will require subsidies for the production of solar, hydroelectric, and wind power and provide employment to offset job losses in carbon based industries. The research for this presentation was conducted in Ottawa, Canada, during my participation in the Summer 2017 Canadian Parliamentary Internship Program.

9:15 – 9:30 a.m.

Canada's law on the possession of firearms: The impact of firearms related deaths

CS = 04

****Nicholas Heeb, Dr. William Green, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

In Canada, firearms are generally viewed as a tool for survival and ownership is seen as a privilege, not as a right as in the United States. At the same time, firearms are subject to considerable regulation by the Canadian Firearms Act of 1995 which defines and classifies firearms, prohibits certain firearm components, requires a license to acquire and own a specific classification of firearm, and where certain firearms can be used. The Act requires a background check and a 28 day waiting period, and where certain firearms safety course, similar to a driver's license, for each license. In spite of the firearms regulations, however, there is not a significant reduction in recent years in the murder and suicide rate in Canada. The research for this presentation was conducted in Ottawa, Canada, during my participation in the Summer 2017 Canadian Parliamentary Internship Program.

9:30 – 9:45 a.m.

CETA: The Canadian European union trade agreement

CS = 05

****Thomas Little, Dr. William Green, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

Twenty-five years after the implementation of the North American Free Trade Agreement (NAFTA), Canadians will have to decide whether to ratify a major trade deal, the Trans-Pacific Partnership, which will join together the twelve Pacific rim countries into one free trade zone. After seven years of secret negotiations, the document was finalized in October, 2015 and will be deliberated in and ratified by each of the twelve countries. If ratified the TPP will be Canada's largest multilateral free trade agreement to date. While many Canadians view the TPP as an essential extension of NAFTA, others doubt its ability to protect the environment, workers' rights, and human rights. This presentation will argue that it is in the best interest of Canadians for the Liberal Party government to ratify the TPP on the basis of the measurable and unquantifiable economic success of NAFTA and the geopolitical advantages of the agreement. The research for this presentation was conducted in Ottawa, Canada, during my participation in the Summer 2018 Canadian Parliamentary Internship Program.

9:45 – 10:00 a.m.

North Atlantic salmon: A species on the brink of extinction

CS-06

****William Razor, Dr. William Green, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

The North Atlantic salmon is dire need of assistance, because salmon stocks are at an all-time low, due to their inability to reproduce in warmer waters. The decline of salmon stocks is a significant concern to the fishing industry which employs 35,000 people and contributes more than \$2 billion to the domestic economy. Unless solutions are implemented quickly, the trend will be irreversible and the species will be faced with extinction. The governing Liberal Party has turned its attention to the issue. The parliamentary Committee for Fisheries and Oceans has put forth seventeen recommendations for government action and the federal Department of Fisheries and Oceans has issued a special report which emphasizes the importance of committing increasing financial support for research to protect the species. The research for this presentation was conducted in Ottawa, Canada, during my participation in the Summer 2017 Canadian Parliamentary Internship Program.

Concurrent Session – 4th Floor Tower

Moderator: Dr. Robert Albert

8:30 – 8:45 a.m.

Prediction of human's movement using machine learning techniques

CS - 7

****Christian Sain, Heba Elgazzar, Mentor, School of Business Administration, College of Business and Technology***

The goal of this project is to design and implement a program utilizing machine learning algorithms to predict the movements of humans using the data collected by smartphones. Classification algorithms were tested over the course of this project to classify the person's movement as one of the following: walking in a straight line, walking upstairs, walking downstairs, laying, sitting, or standing still. The algorithms were trained by using a dataset that was collected using a study of 30 people from different ages wearing a Samsung Galaxy S II on their waist to capture their movements using the smart phone's gyroscope. A total of 561 features were used to capture the behavior of mobile users. The used algorithms are random tree forest, JRip, and PART. Random tree is an algorithm that creates a single decision tree, while random tree forest creates multiple decision trees. JRip is a Repeated Incremental Pruning to Produce Error Reduction (RIPPER). PART is an algorithm that builds a partial decision tree in each iteration and makes the best leaf into a rule. The final program will use these three algorithms to classify the data and then compare the accuracy of the three algorithms.

8:45 – 9:00 a.m.

Design and implementation of fuzzy controller for an aeroponic system

CS - 8

****+S. Sarah Ahmadi, Brook Hall, Molom-Ochir Mijid, Dr. Jorge Ortega-Moody, mentor, School of Engineering and Information Systems, College of Business and Technology***

An aeroponic system is an indoor gardening technique in which plants grow, with their roots suspended in the air, and feed on water-soluble nutrients through continuous spraying. Under this circumstances, different environment can be used for different types of vegetables. Each environment needs to be monitored and controlled to get productive crops, faster growing and most important a better quality produce or crop. In this project, human machine interface (HMI) which provides a control and visualization interface between a human and a process is applied. The monitoring system is used to monitor the chamber's parameters such as temperature and humidity for different environments which will be displayed on LCD. The control and automation system is designed to manage actuators in delivering water and nutrients to the plants with the help of pumps and filters. A fuzzy controller is introduced to control temperature and humidity. The potential of this system is that, it can provide perfect condition for several agricultural researches with this controllable environment. Moreover, this indoor greenhouse is a perfect way to supply healthy food in more convenient ways.

9:00 – 9:15 a.m.

Autonomous tractor

CS - 9

****Brenton Anderson, Dr. Jorge Ortega-Moody, mentor, School of Engineering and Information Systems, College of Business and Technology***

Here in Kentucky we have a lot of farms and one common problem is that they usually have old tractors without GPS systems. This is even a problem with MSU's farm. Newer tractors and standalone GPS systems are expensive. By creating our own system we can bring the benefits of GPS to MSU's Agricultural department at a fraction of the cost, and MSU's students can be trained on how to use such a GPS system. We will use a microcontroller to interface with a hobbyist drone GPS system. The first step is to read the data that the GPS system would send to a drone's stepper motors and convert it to what we need to control a DC motor. The motor will be used along with a gear structure to turn the tractor's wheel. This system will be tested on the tractors at MSU's farm. The Arduino Uno and GPS platform has been provided by Dr. Moody and the Engineering Technology department. The gear system will be made in-house by a peer.

9:15 – 9:30 a.m.

Design and construction of student automation workstations

CS - 10

***+Lindsay Childs, Dr. Jorge Ortega-Moody, mentor, School of Engineering and Information Systems, College of Business and Technology**

Over recent years the manufacturing industry has seen a major growth in the incorporation of automation into their various processes. The term automation refers to the use of almost completely automated equipment to complete various objectives, these systems usually include mechanization and robotics. The increase in the use of this type of system has created a demand for employees who understand the basics of these systems and how to operate them. To meet this demand Morehead State University's Department of Engineering and Technology Management (ETM) has acquired new automation equipment in order to train students on the innovations. New student work stations have been developed and constructed using new and donated equipment, as well as repurposed components from older models. The ETM department currently has courses, such as the Programmable Logic Controller course, and will incorporate new courses pertaining to Mechatronics and Automation. These courses will help students become familiar with the newest type of equipment that is being used in industry and give them a competitive advantage when entering the workforce. In addition, the department will also be able to offer industrial training to employees of local companies.

9:30 – 9:45 a.m.

Utilizing display and greenhouse technology to facilitate a healthier generation

CS - 11

***Brooke Hall, Dr. Jorge Ortega-Moody, mentor, School of Engineering and Information Systems, College of Business and Technology**

With the growing popularity of healthy living, people are starting to want answers as to where and how their food is being grown. This worry, however, could be eliminated if consumers had the knowledge and time to raise their own crops. People growing their own fruits and vegetables also becomes infeasible when they need to grow produce that can only thrive in specific climates. The development of a greenhouse was first introduced to accommodate the changing climates. Now this technology needs to be implemented in a way that the average person can utilize it within a constrained space either inside or outside of their home. By developing a significantly smaller hydroponic greenhouse that can be plugged into a wall, this has become reasonable. On the system is a Human Machine Interface (H.M.I) that makes it easy to select the specific environment the produce requires and monitor the plants health. The HMI is a seven-inch Nextion display that can be altered by its own, free software. The Nextion display will receive the plant's health and environment status from the microcontroller Arduino Mega 2560, which can also be programmed by its own, free software.

9:45 – 10:00 a.m.

Electrical analysis of a smart monitoring and control system for green house

CS - 12

***+Molom-Ochir Mijid, Dr. Jorge Ortega-Moody, mentor, School of Engineering and Information Systems, College of Business and Technology**

There are serious problems that the world is facing as global warming, population rise, soil degradation, water pollution and food security. The Green House, said otherwise Smart Aeroponics System, with autonomous control system can contribute to deal with these problems, in the MSU robotics laboratory. The purpose of this project is to determine functionality of control system, hardware components and Printed Circuit Board (PCB) and how they conforms to the electrical requirements for the autonomous control system. The number of electrical requirements should be inspected in electrical analysis. Also, it can test the critical characteristics of specific electronic components, to catch errors in components, placement and soldering. Specifically, this project has a microcontroller based hardware system which is most cost effective and realistic model. According to the electrical analysis process, the well adjusted and checked Monitoring and Control System will bring broad progress to the smart life.

10:00 – 10:15 a.m. Content-based image retrieval

CS - 13

****Binamrata Sharma, Heba Elgazzar, mentor, School of Engineering and Information Systems, College of Business and Technology***

Instead of searching for images with keywords, how convenient would it be if we could use an image to search for similar images in a database of images? In content-based image retrieval we use a query image to retrieve images that share similar contents with the query images. In my research, I have used colors and edges as a basis of similarity between two pictures. Based on the colors and edges from my query image, my algorithm will detect images in a dataset that share similar colors and edges as that of query images. I have designed my program such that the result will consist of 10 most similar picture. I have used python as my prime language, and utilized opencv for necessary image analysis.

10:15 – 10:30 a.m. Break

10:30 – 10:45 a.m. Measuring quality in a residential construction

CS - 14

****+Daniel M. Carter, Dr. Kouroush Jenab, mentor, School of Engineering and Information Systems, College of Business and Technology***

Measuring quality in a Residential Construction job is a fundamental responsibility of a General Contractor. This responsibility can be a difficult undertaking, and is more complicated than simply assessing the quality of the building materials used or the quality of the reputation of sub-contractors. General Contractors need more meaningful information than in the past, and jobs are now made up of more sub-processes, thus making jobs more complex. Duration of projects and financial stakes are increasing and time and cost requirements are more and more difficult to achieve. Job measurement is usually based on observations by professionals and stakeholders or the use of metrics such as Key Performance Indicators (KPIs) that are calculated to embody the health of the construction job, and can be used to forecast future job performance. The evaluation of this research should demonstrate that the overall quality of a building is not a simple sum of the quality of subparts but it depends also on the relation –quality between subparts, and it is the synthesis of all of these contributions that develops the building quality concept.

10:45 – 11:00 a.m. An evaluation of expansion and depth of travel of the 9mm Luger and 40. caliber Smith and Wesson ammunition

CS - 15

****+Jarred Hunt, Dr. Kouroush Jenab, mentor, School of Engineering and Information Systems, College of Business and Technology***

In this study experiments were performed by firing spherical hollow point bullets into materials to simulate obstructions commonly found during police response to deadly force. The research was conducted to determine whether or not a 9mm Luger round could penetrate and expand better than the 40. Caliber Smith and Wesson. This experiment is in part being completed due to the latest evaluation of ammunition from the Federal Bureau of Investigations. The Federal Bureau of Investigations determined that due to new technology a 9mm Luger has as much expansion and depth of travel as a 40. Caliber. Testing the theory three basic materials/methods were used to evaluate the expansion and penetration of the ammunition: vehicle door panel, side window and windshield. The side door panel range of fire would be from the distance of three yards. To test the hollow point bullet's results of glass penetration the distance was seven yards. The findings of the study have demonstrated that a 9mm Luger does not have as much penetration depth as the 40. Caliber Smith and Wesson. Although the difference in depth was minimal, expansion and weight retention of the 40. Caliber bullet performs at a greater level for law enforcement situations.

11:00 – 11:15 a.m. Quality improvement with PFMEA in a manufacturing system

CS - 16

***+Xiaotong Pang, Dr. Kouroush Jenab, mentor, School of Engineering and Information Systems, College of Business and Technology**

This research reports the potential failure mode and effect(s) analysis for a performance bearing production process in a manufacturing system. In this research, Pareto Charts, Cause and Effect Diagrams (Ishikawa/Fishbone), and Statistical Process Control (SPC) Charts interlinking PFMEA are used in order to analyze the major potential failure mode and effect(s) for making high performance bearing. As a result, this research improved PFMEA process and increased efficiency and customer satisfaction. The researcher have revised the previous PFMEA of the performance bearing production line with the recommended actions in order to meet the current status of the production process. The data of the first past yield (number of pieces of reworked), scrap pieces & cost, and internal PPM have been analyzed to assist the researcher and the quality team to reduce the Risk Priority Number (RPN) of the current process steps; it also focuses on reducing the highest number among severity (SEV), occurrence (OCC), and detection (DET) in order to improve productions and enhancing efficiency.

11:15 – 11:30 a.m. Design and production of autonomous tractor controller

CS - 17

***Justin VanHoose, Dr. Jorge Ortega-Moody, mentor, School of Engineering and Information Systems, College of Business and Technology**

In Kentucky, agriculture employs not just people, but entire families that dedicate their lives to the business of farming. With the addition of an autonomous tractor, a single farmer could plow as many fields as they choose all at once to meet the needs of the population. We intend to accomplish this by creating a gear system that turns any older tractor into an up to date autonomous vehicle. This system will be connected to a GPS system connected with a microcontroller. The research team has been tasked with the development and design of the gear system that would control the tractor remotely. A single specialty gear which included tracks for bearings to sit into so that the gear would hold steady was designed. These bearings which were also designed and produced from our lab, were meant to hold the gear tight as well as provide a smooth track for the gear to turn easily. The driving gear was scaled down and redesigned to serve as the driving force behind the system. Providing electricity to the motor will provide enough torque and speed to turn the tractor's steering wheel at a very steady pace.

11:30 – 11:45 a.m. The impact of capital structure on profitability: An empirical analysis of U.S. manufacturing companies

CS - 18

***+Cuibing Wu, Dr. Nilesh Joshi, mentor, School of Engineering and Information Systems, College of Business and Technology**

The principal objective of this study is to investigate the effect of capital structure on the profitability using a panel data sample representing 15 largest U.S. manufacturing companies. The most recent five-year data was used for the analysis. The panel (data) analysis methods are used to empirically construct the regression models of capital structure ratios and profitability ratios. The study findings indicate that the capital structure has a significant influence on the profitability of the companies we studied. Particularly, the Debt to Equity (DE) and the Financial Leverage (FL) ratios, which reflect the capital structure, have statistically significant impact on the two profitability ratios: Return on Equity (ROE) and the Return on Invested Capital (ROIC). Furthermore, it has been observed that the Firm Size (FS), a control variable in this study also has an effect on the firm's profitability.

Concurrent Session – 5th Floor Tower

Moderator: Dr. Chris Miller

8:30 – 8:45 a.m. **The incorporation of Waldorf into public schools**

CS - 19

****Mallory Aronhalt, Dr. Lola Aagaard, mentor, Department of Foundational and Graduate Studies in Education, College of Education***

This research study investigated Waldorf education, as developed by Rudolf Steiner in Germany in the early 1900s. Information was gathered through a combination of literature review, interviews with American Waldorf teachers, and observation at a Waldorf school in Ohio. Although some of the spiritual elements of Steiner's philosophy remain controversial, educators cannot afford to overlook the effective teaching methods of the Waldorf school. If public schools were to implement some of the Waldorf school's elements, the nature of public education could change for the better. Public education could be improved by incorporating the Waldorf school's focus on developing imagination and creativity in the child; implementing an educational system based primarily on the psychological and physical development of the child; and shaping a child who is directly, genuinely, and physically aware of the natural world around him or her. Such an educational system could have profound effects on the intellectual, emotional, and physical growth of the child, resulting in a more confident, well-rounded, creative adult. This project was supported by an Undergraduate Research Fellowship.

8:45 – 9:00 a.m. **Girls only: Creating a mentoring group for elementary students in an after-school program**

CS - 20

****Kristen Carpenter, *Madison Stachler, Dr. Jeannie Justice, mentor, Department of Foundational and Graduate Studies in Education, College of Education***

The Haldeman Community Center, located in a low socioeconomic area, sponsors an after-school program for K-6 students. For our project, we focused on the older girls, ranging from 4-6 grades, due to a lack in older boy participants in the program. Our goal was to help teach these girls life skills and help with maturity issues. Our methods were to meet twice a week with the five to eight, depending on attendance, girl participants, engaging them in hands-on, visual lessons over topics such as nutrition, hygiene, drugs, bullying, self-confidence, Internet safety, and respect. We assessed their knowledge by administering both a pre- and post-test on appropriate behaviors and general knowledge on the chosen topics. Results included tremendously improved post-test scores as well as improvements on attitude, relationships, and respect. These girls related to many of the topics, especially the topic of drugs, which effected many people in their lives. In conclusion, we found that hands-on activities worked the best while controversial discussions such as Internet safety did not work, but a different approach might have been more beneficial. This experience helped not only the students, but also ourselves as future educators reinforcing our desire to teach and our teaching philosophies.

9:00 – 9:15 a.m. **Are schools increasing the digital divide?**

CS - 21

****+Stacie Slusher, Dr. Jeannie Justice, mentor, Department of Foundational and Graduate Studies in Education, College of Education***

The study included an investigation of the literature regarding the concept of the digital divide, both the first-level (access to technology) and the second-level (ability to use technology). The literature review chronicles the access and use divides; however, newer literature revealed the emergence of another type of digital divide related to opportunity. This work explores the notion that institutional policies and procedures can not only negatively impact technology integration and prevent the closing of the divide, but significantly increase the newest divide. Are we adding to inequity for students through policies? Are schools resistant to technological change and why? Are we helping to widen the traditional divides and increase the newer third-level divide? This research investigates the concept of opportunity hoarding created by school policies and dispositions of teachers.

Concurrent Session – Library Classroom 201

Moderator: Dr. Jeanne Petsch

8:30 – 8:45 a.m. Effects of multiple glaze layers on surface and function of a ceramic vessel

CS - 22

****Garrett Baldrige, Adam Yungbluth, mentor, Department of Art and Design, Caudill College of Arts, Humanities and Social Sciences***

In the world of fine art and commercial ceramics all functional work is glazed in order to hold food or liquids. These tests were developed to not only find a set of well-functioning food safe glazes for the dept. of Art and Design's ceramics studio, but also to demonstrate the effects of each glaze in combination with another glaze in the studio. All combinations are then on display in the ceramics studio. This research was supported by MSU Undergraduate Research Fellowship.

8:45 – 9:00 a.m. Down the Rabbit Hole: A graphic novel

CS - 23

****James Davidson, Elizabeth Mesa-Gaido, mentor, Department of Art and Design, Caudill College of Arts, Humanities and Social Sciences***

Alice in Wonderland by Lewis Carroll is a childhood classic with many different forms of adaptations. The project provides a new contemporary take on this classic, showcasing the protagonists with antagonistic, darker undertones. With this graphic novel, many current concepts are explored relating to social, emotional, and mental health issues. An intimate and raw view of the beloved childhood characters is presented. Character depictions are more mature, crude, and unnerving. Narration is created through hand-drawn pages and text. Multiple manuscript drafts are edited to create the final panel scripts which are merged with the drawn images; the final stage requires scanning the images to create digital files, which are color corrected and edited in Photoshop. Thorough and meticulous research in collaboration with many of the departments on campus, in combination with personal studies of other artist's graphic novels, are used to create an accurate and in-depth graphic novel incorporating concept ideas, character analysis, and storyboarding. This research project was supported by an Undergraduate Research Fellowship.

9:00 – 9:15 a.m. The art of exhibitions

CS - 24

****Nicole Duff, Jennifer Reis, mentor, Department of Art and Design, Caudill College of Arts, Humanities and Social Sciences***

The Undergraduate Fellowship in The Art of Exhibitions focuses on the management, design, installation and promotion of arts programming specific to large-scale university exhibitions and events within a university context. Nicole Duff was engaged in the hands-on creation and management of art events during the 2017-2018 academic year including six large-scale faculty, student, and professional artist exhibitions, the annual Halloween Costume Contest and Rocky Horror Picture Show, and the eighth annual Craft Bizarre: MSU Student Art & Craft Sale. Duties included exhibition design, installation, creation of wall-mounted exhibition text, event management and hospitality, art handling, receiving, and public relations. Her work included hosting evening and weekend programming as well. This fellowship is designed to prepare a student to begin a business in arts entrepreneurship and/or a career in arts administration. Supported by the CCAHSS and Department of A&D.

9:15 – 9:30 a.m. Healthy lifestyle and wellness education at the Haldeman Community Center After School Program

CS - 25

****Kansas A. Greenwell, Joy Gritton, mentor, Department of Art and Design, Caudill College of Arts, Humanities and Social Sciences***

For this project children participating in the Haldeman Community Center After School Program were offered opportunities to learn about gardening, nutrition, and physical activity. The activities provided were to help them make healthy lifestyle decisions in the future. Children from kindergarten through six grade experienced growing their own vegetables and using what they grew to prepare simple dishes. They learned about nutrition and participated in age-appropriate physical activities to help them realize the importance of staying active. This educational program was supported by an MSU Undergraduate Research Fellowship.

9:30 – 9:45 a.m. The art of cultural programming

CS - 26

****Bethany Pace, Jennifer Reis, mentor, Department of Art and Design, Caudill College of Arts, Humanities and Social Sciences***

The Undergraduate Fellowship in The Art of Cultural Programming focuses on the logistical planning, management and marketing of arts programming specific to large art and design exhibitions and events within a university context. Embedded within the arts programming hosted by the Claypool-Young Art Gallery, UR Bethany Pace focused on the coordination and management of art events during the 2017-2018 academic year including six large-scale faculty, student, and professional artist exhibitions, the annual Halloween Costume Contest and Rocky Horror Picture Show, and the eighth annual Craft Bizarre: MSU Student Art & Craft Sale. Duties included event management and hospitality, art handling, receiving, and public relations. Her work included hosting evening and weekend programming as well. Ms. Pace also spearheaded the January 2018 Restore Kentucky Arts Funding event at CoffeeTree Books through the Emerging Arts Leaders of Eastern Kentucky. This fellowship is designed to prepare a student to begin a business in arts entrepreneurship and/or a career in arts administration. Supported by the CCAHSS and Department of A&D.

9:45 – 10:00 a.m. The art of cultural advocacy

CS - 27

****Dustyn Alexander Pruitt, Jennifer Reis, mentor, Department of Art and Design, Caudill College of Arts, Humanities and Social Sciences***

The Undergraduate Fellowship in The Art of Cultural Advocacy focuses on the management of cultural programming within a university context as well as arts advocacy on campus and in the region. Mr. Pruitt gained hands-on skills in the coordination of art events during the 2017-2018 academic year including six large-scale faculty, student, and professional artist exhibitions, the annual Halloween Costume Contest and Rocky Horror Picture Show, and the eighth annual Craft Bizarre: MSU Student Art & Craft Sale. Duties included event management and hospitality, art handling, receiving, and public relations. Additionally, Mr. Pruitt was a student manager and speaker at the January 2018 Restore Kentucky Arts Funding event at CoffeeTree Books through the Emerging Arts Leaders of Eastern Kentucky. This fellowship is designed to prepare a student to begin a business in arts entrepreneurship and/or a career in arts administration. Supported by the CCAHSS and Department of A&D.

10:00 – 10:15 a.m. Using art to teach recycling and pride in the region

CS = 28

****Kaitlyn Rhoden, Joy Gritton, mentor, Department of Art and Design,
Caudill College of Arts, Humanities and Social Science***

It is very important that children of today are exposed to the arts, since they may not have extensive exposure at their schools. While art is a wonderful outlet for stress and creativity, it can also be used to teach about issues communities are facing, (such as pollution and litter), and to foster awareness of a community's history and pride in heritage. For this project, children attending the Haldeman Community Center After School Program participated in art activities in a variety of media (collage, paper bead making, and quilting) using recycled materials in order to make something new from "trash" and help the environment. The children also learned about their community and the history of the area in hopes they will gain a new-found respect for their home, both on a local and global scale. This project was supported by an MSU Undergraduate Research Fellowship.

10:15 – 10:30 a.m. *Break*

10:30 – 10:45 a.m. *Agriculture: All around us everyday!*

CS = 29

****Madison Stachler, Joy Gritton, mentor, Department of Art and Design,
Caudill College of Arts, Humanities and Social Sciences***

This project is part of an on-going effort to offer agricultural education activities for students participating in the Haldeman Community Center After School Program. Emphasis is placed on animal behavior, appropriate care for animals and gardens, and the importance of maintaining habitat and biodiversity. The children are guided in planting and maintaining their own on-site garden. The project also promotes themes fostered at the Haldeman Community Center: kindness, personal responsibility, working together cooperatively, and respect for others. This project is supported by an Undergraduate Research Fellowship.

**10:45 – 11:00 a.m. *Penzu online journaling: Benefits of the social integration for the
International Peer Mentoring Program at Morehead State University***

CS = 30

****Hannah Day, *Joseph Brock Finley, Dr. Donell Murray, mentor,
Department of Communications, Media and Languages, Caudill College
of Arts, Humanities and Social Sciences***

Social integration in this international peer mentoring program can be as important as academic integration. In the selection of a social integration tool, Penzu online journaling was selected. Penzu focuses on privacy and is available in a free phone application for ease of use any time during the day or night. A weekly Penzu journal entry consisting of graphics and text, between the peer mentor and the peer mentee, is shared within the program. In this qualitative study, a focus group and interviews studied the benefits of social integration when using an online journal.

11:00 – 11:15 a.m. **From past to present: Olive Dame Campbell's *Appalachian Travels***

CS - 31

***Alexa Potts, Dr. Philip Krummrich, mentor, Department of Communications, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

Olive Dame Campbell's *Appalachian Travels* is a published version of her personal diary during a journey with her husband in the early twentieth century to survey educational and religious organizations working in the Appalachian region. Like most travel writers, Campbell approached the Appalachian region, including the state of Kentucky, with preconceived notions; however, her diary affords readers today a perspective on her observations of the Appalachian educational system along with changes in her preconceived notions. Topics such as the relationship between education and religion, gender inequality in the schooling system, and conditions of learning environments and homes all came to preoccupy Campbell as she became more familiar with the area. It is fascinating and instructive to compare the historical observations made by Campbell in the early twentieth century and the conditions today in this region.

11:15 – 11:30 a.m. **Dissecting the spectrum of femininity**

CS - 32

***Brooke Donahue, *Minh Tran, *Silvia Milantoni, Dr. Ann Andaloro, mentor, Department of Communications, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

This project intends to break open the word femininity and give it a more appropriate definition. From reaffirming the Goddess through the arts, finding out the American dream from international students at Morehead State University, and exploring various ideals of gender roles from around the world -this presentation will bring forth a more modern idea of the word feminine. In politically charged times like today, it is very important to be inclusive to all people and represent all those who fall under the umbrella of feminine, not just the ones who fit into the box society has built for them. This project is supported by Undergraduate Research Fellowships.

11:30 – 11:45 a.m. **Appalachia is America, America is Appalachia: The struggle for ideology and identity in Trump country**

CS - 33

***Henry Clay Adkins, Dr. Thomas Kiffmeyer, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences**

The conception of Appalachia as an entity of American "otherness" or as "Trump country" filters through the national media on a regular basis since the election of 2016. The ideology and image of Appalachia as an entity of American otherness has been a misconception of the region's culture. This misconception of culture derived from historical ignorance and American prejudices of the late 1800s. Writers romanticized Appalachia in popular magazines of the epoch to an urban middle class audience as a "strange land with peculiar people." Appalachia's culture soon became contradictory to the rest of America's "progress." Writers and politicians unjustly categorized Appalachia as a region outside of America since 1870. This misinterpretation of culture has restricted the natural progression of Appalachia either by external interventionism or internal rebellion against the intervention. Appalachia has remained an unsolved "problem" for America, which has resulted in Appalachia continually being "rediscovered" during times of national crises. In 2016, J.D Vance's *Hillbilly Elegy* continued the similar dialogue and distorted perspective on Appalachia as previous writers. Donald Trump and mainstream media outlets seized the opportunity initiated by Vance to either manipulate or criticize Appalachia as Trump country. This research project was supported by an undergraduate fellowship.

Concurrent Session –2nd Floor Commons

Moderators: Dr. John Ernst and Dr. Dianna Murphy

8:30 – 8:45 a.m.

Off with their headscarves: The social, political, and legal ramifications of French Laicite

CS - 34

****Brandon Bryer, Dr. William Green, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

In Western democratic nations, the fundamental right to freedom of religion is subject to legal limitations. In France, the principle of laicite, or secularism, which traces its origins to Revolution of 1789, excludes religion from the public domain and restricts it to the private sphere. In response to the practice of Muslim women of wearing religious garments, the French National Assembly enacted a law in 2004 prohibiting girls from wearing headscarves in public schools and six years later prohibiting women from wearing the burqua in public. These laws were upheld by the French Constitutional Council and then appealed to the European Court of Human Rights. The Court upheld the laws against the claim that they intruded upon the freedom of religion protected by Article 9 of the European Convention on Human Rights, because of France's interest in public health and safety and the maintenance of a religious neutral society.

8:45 – 9:00 a.m.

Immigration flows and the rise of ethno-nationalism in Europe

CS - 35

****Sarah Maria Buschman, Dr. James Masterson, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

Using panel data from five years of the Eurobarometer survey, this research aims to understand the impact that the recent surge in immigration flows into European countries has had on a rise in nationalist and anti-immigrant attitudes.

9:00 – 9:15 a.m.

Multi-level analysis of secondary school funding and educational achievement in Kentucky, 2011-2015

CS - 36

****Matthew D. Cooper, Dr. James Masterson, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

Beginning with data from secondary schools in all 73 districts in Kentucky across a five-year span, this work seeks to test whether or not high school funding and achievement in education are linked, all things equal. Various studies have shown conflicting results to this relationship. This research advances our understanding of the relationship of these two critical factors for the case of the Commonwealth of Kentucky. Using a hierarchical linear regression model, we attempt to measure the influence that school and district resources, in terms of total spending per student, instructional spending per student, and technology spending per student, have on ACT and KPREP scores in Kentucky for 2011-2015. We combine this data with a host of control variables found in the literature, including socioeconomic and demographic data as well as crime data.

9:15 – 9:30 a.m. **Does a Legal Studies degree provide long-term benefits to our students attending and graduating from law school?**

CS - 37

****Matthew Hezsetine, Dr. Kelly Collinsworth, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

MSU is one of the few four-year Legal Studies programs approved by the American Bar Association for paralegal education. However, the majority of students at this time desire to attend law school rather than working as a paralegal. This project looks at current data provided by the Law School Admissions Council on student achievement in law school in order to create a survey of graduates from the program in the last ten years. The survey information will be used to quantify benefits from the program for future attorneys, as well as possible changes in programmatic offerings.

9:30 – 9:45 a.m. **Identifying and addressing barriers to self-representation in court in probate matters**

CS - 38

****Michala Jones, Dr. Dianna Murphy, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

Pro se representation literally means “on one’s own behalf.” *Pro se* cases make up a significant portion of cases before the courts in low-income areas such as Eastern Kentucky. The inability to afford legal representation has increased the length of time for processing probate matters. For instance, in Rowan County in 2016, it took an average of eight months to close a probate case. The current Kentucky probate forms use legal terminology and provide no instructions making it difficult for lay persons to complete, especially those with little legal knowledge and formal education. The research aims are twofold. First, to redraft legal forms that are more easily understood and user friendly. Second, to design a clinic to assist *pro se* applicants who may need further assistance with preparing documents needed to transfer real estate that has little monetary value. This research was funded with an undergraduate research fellowship.

9:45 – 10:00 a.m. **Urban wineries: The new frontier**

CS - 39

****Thomas Little, Dr. William Green, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

Gallo and twenty-nine other large wineries dominate the wine industry producing 92 percent of domestic wine. The wine industry also includes 4,000 boutique wineries located in rural settings. The new frontier in boutique wineries, the urban winery, either ships in the grape juice or grows its grapes in the country nearby and then transports them to the urban winery for crushing, fermentation, and aging. These urban wineries offer production tours, tasting rooms, and retail sales. Some have restaurants and live entertainment and others offer customers the opportunity to make wine, bottle it, and design the labels. Cities, such as Cincinnati, Los Angeles, Seattle, and San Diego encourage the growth of urban wineries, because they contribute to a more diverse urban experience for their residents and tourists.

10:00 – 10:15 a.m. Continuing from scratch: Taking over the reins of an on-going service project

CS = 40

****Amethyst Muncy, Dr. Kelly Collinsworth, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

Taking the lead on a project, such as the Pro Se Divorce clinic, can be extremely intimidating for someone with very little experience. The clinic informs and assists people with their divorces. Petitioners represent themselves, but the students advise them and help them fill out the necessary legal forms. It is then the job of the coordinators of the clinic to see to it that the clients attend the clinic, that the forms are properly filled out by participants, that the spouses receive and properly fill out their paperwork, that the judges receive the paperwork and return the decree, and that the divorce is finalized and closed. For a new engagement fellow, taking over the lead role of coordinating a long-term service project requires the student to determine the most effective way to go about the process, how to stay organized, and learn to oversee the work of others. They also must have the confidence to make changes that work best for them, while maintaining the integrity of the project. This session will focus on how to smoothly transition into leadership positions with confidence. This engagement fellowship is funded by the Center for Regional Engagement.

10:15 – 10:30 a.m. *Break*

10:30 – 10:45 a.m. The sometimes-queens of Wessex and women in Anglo-Saxon culture

CS = 41

****Jonathan Dean, Dr. Alana Scott, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

The medieval world is traditionally treated as a difficult time for women, who lacked the rights and powers granted to men. While this is partially true, women found other ways to exercise influence and power, often through the education of their children or the Church. This holds true for the royal consorts of Wessex, one of the Anglo-Saxon kingdoms in the early Middle Ages. These women were unique among Anglo-Saxon consorts because, very intentionally, they were not given the title “queen.” This presentation will explore the history of the West Saxon royal consorts and how they fit into Wessex, taking into consideration the significance of women in the Church, their role in education, and their political – and sometimes military – influence, all of which come through in the lives of such women as Seaxburh, Osburh, Eadburh, Judith of Flanders, Ealhswith, Ælfthryth, and Emma of Normandy. These lives will also be examined to glean some insight regarding the status and condition of women in the Anglo-Saxon world. This research was funded through an undergraduate research fellowship.

10:45 – 11:00 a.m. **Democratization in Tunisia and Turkey: A comparative case study of successful liberalizing reforms in the middle east**

CS - 42

***Max Prowant, Dr. Jonathan Pidluzny, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences**

There are no consolidated liberal democracies in the Muslim-majority states of the Middle East and North Africa. Where democratic institutions have emerged, the experiment has tended to be short-lived and illiberal. Likewise, where there is relatively liberal governance, there are few functioning democratic institutions. The one hopeful exception in the region is Tunisia. Since protestors ousted President Ben Ali in 2011, Tunisia has held two parliamentary elections and scores consistently high on human rights indexes. Why Tunisia alone has emerged as the region's most promising candidate for liberal democracy remains a contested issue among scholars of the region. In spite of the question's importance, recent scholarship has neglected a comparative analysis with Kemal Ataturk's Turkey, the closest case for comparison to explain Tunisia's success. Examining the democratic transitions in 20th century Turkey and 21st century Tunisia, this project will argue that Tunisia followed a similar path of reform as Turkey, placing particular emphasis on the role secularizing reforms of Ataturk and Ben Ali played in fostering societies with liberal attitudes. This project received generous support from MSU's Undergraduate Research Program.

11:00 - 11:15 a.m. **Machiavelli's republican turn: How the *Discourses on Livy* foreshadows key features of the American constitutional tradition**

CS - 43

***Alexandra C. Quillen, Dr. Jonathan Pidluzny, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences**

Niccolò Machiavelli's critics have long accused him of denying that moral/ethical standards have any ontological basis, infamously denigrating him as a 'teacher of evil'. These accusers, struck by the extreme teachings contained in *The Prince*, tend to overlook the purpose of his other works, most important among them, the *Discourses on Livy*. This paper argues that Machiavelli's meditation on Rome is designed to construct an imaginary republic, one that remediates the flaws and duplicates the successes of history's most celebrated *popular* regimes: Rome, Sparta, and Venice. To the surprise of his detractors, Machiavelli's ideal republic resembles the American Republic in several important respects: both seek to limit the power of the executive through a careful separation of powers; and, much like the American founders, Machiavelli believed republics exist to protect, defend, and encourage the common good. Thus, this project intends to rehabilitate Machiavelli's reputation, both by revealing the reliance of later republican theorists on his ideas (including those the American framers turned to for inspiration), and by taking a new look Machiavelli's political intention. After all, he claims he has taken a path "as yet untrodden" to benefit later generations. This project received generous support from MSU's Undergraduate Research Program.

11:15 – 11:30 a.m. A tale of two foundings: The political roots of America's central principles in the creation of the first colonies

CS - 44

****Tyler Syck, Dr. Jonathan Pidluzny, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

The American Republic is among the greatest political and ideological achievements in the history of mankind. The principles laid out in its founding documents, such as the Declaration of Independence, have helped lay a basis for liberal democracies the world over, and have long been beacons of freedom to oppressed people everywhere. However, these ideas and principles did not spring up all of a sudden one hot July in 1776. The political system, and the philosophy that undergirds it, were forming from the very first day that English settlers came to the new world. This project examines these principles as they originally emerged in several exceptional colonies—which placed different levels of emphasis on religious liberty, free market principles, and limits on the central government's authority—by examining the primary source documents that shaped their social and political evolution. This project received generous support from MSU's Undergraduate Research Program.

11:30 – 11:45 a.m. The magic of money: An analysis of the economic aspects of the Salem witch trials

CS - 45

****Gabrielle Townsend, Dr. Alana Scott, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

While there have been several studies on the multiple causes of the Salem witch trials, there has not been sufficient research regarding how the religious Reformations across Europe influenced the rise of Puritan beliefs and the hysteria that sparked the trials. In particular, little research has been done focusing on the calculated economic aspects enacted by the Church in an effort to gain more power. This research aims to examine the influence of factionalism, the movement away from agriculture to rising commerce, and the motives of church ministers in order to prove that the Salem witch trials resulted from economic influences rather than a mere situation of religious hysteria.

11:45 – 12:00 p.m. Break

12:00 – 12:15 p.m. Music as a means of healing: The effects of music therapy concepts with regard to elementary school age children and on infants in the neonatal intensive care unit

CS - 46

****Cassie A. Gibson, Dr. Lori Baruth, mentor, Department of Music, Theater and Dance, Caudill College of Arts, Humanities and Social Sciences***

Music therapy has been proven to help people in many capacities, from education to the medical field. This study will focus on the effects of music therapy concerning children in elementary school as well as infants in the Neonatal Intensive Care Unit. This project will research and describe what music therapy is and what it encompasses. It will then describe several forms of healing for children in elementary schools, such as coping skills for depression, anxiety, autism, as well as therapy for the specially abled child. Additionally, this project will report on research findings of the benefits that music therapy has in the medical field, more specifically, the NICU. This project is designed to raise awareness of how music provides healing to infants and children. With this UG fellowship, we hope to provide evidence of music therapy as healing based on recent research, therefore presenting a strong argument as to why children need music in their lives.

12:15 – 12:30 p.m. The stories wardrobes tell: The clothing of ancient civilizations and what it illuminates about the past

CS - 47

****Lydia Kabzinski, Denise Watkins, mentor, Department of Music, Theatre and Dance, Caudill College of Arts, Humanities and Social Sciences***

Through the passage of time, the clothing people wear has continued to evolve, reflecting the society in which they have lived. As such, researching clothing from different periods and geographical locations tells us much about history. Using evidence found on ancient pottery and vase paintings, wall murals, and other depictions of everyday life, this study has largely focused on the wardrobes of Ancient Egyptians, Minoans, Greeks, and Romans, illustrating how clothing differentiated between the social classes, separated the Gods from mortals, and indicated wealth and power. When this part of human life is investigated, one realizes the deeper meaning clothing really has in our lives. This research was funded with an Undergraduate Research Fellowship.

12:30 – 12:45 p.m. Raunch culture president

CS - 48

****Abbey Geurin, Dr. Bernadette Barton, mentor, Department of Sociology, Social Work and Criminology, Caudill College of Arts, Humanities and Social Sciences***

Raunch culture, which describes the hyper-sexualized world we live in, influences daily social life. Institutionalized sexism conditions boys and girls to look and act within the realm of societal norms, often silencing individual identity. The 45th presidential election brought several elements of raunch culture to the surface as Donald Trump exhibited and encouraged sexist behavior. Drawing on interview data with millennials, this presentation explores how e-bile, celebrity culture, internet pornography, and raunch culture work together to normalize the objectification of women, and habituate internet users to uncivil discourse, in particular degrading and bullying language toward minority members. This presentation shows how raunch culture aided and abetted Trump's win, and continues to color elements of his administration. This research was supported by the MSU Undergraduate Research Fellowship program.

12:45 – 1:00 p.m. Morehead State University's collection of vintage physics equipment

CS - 49

****James Logan Hankins, Dr. Jennifer Birriel, mentor, Department of Mathematics and Physics, College of Science***

The preservation of antique and vintage instrumentation is a common practice across all disciplines. Such items are found in museum, universities and personal collections. Morehead State University started as Morehead Normal School in the 1930s so it is not surprising that a small variety of vintage physics equipment exists on campus. We collected physics equipment from labs and storage areas and set about the task of identifying each piece. Identification methods included internet searches, professional assistance, and company consultation. The goal is to establish a display this vintage equipment in the public "museum" area of Lappin Hall. In this talk, we discuss our identification methods and present a sample of some of our most impressive vintage pieces. This research was supported by the MSU undergraduate research fellowship.

Concurrent Session – Learning Resource Center

Moderators: Dr. Wayne Miller and Mrs. Darlene Allen

8:30 – 8:45 a.m. Effect of sire breed on gestation length, piglet birth weight, litter weight, and litter size

CS - 50

****Audrey L. Emery, Courtney K. Moore, Dillon Q. Siefert, Drs. Flint Harrelson and Patricia Harrelson, mentors, Department of Agricultural Sciences, College of Science***

Purebred sows generally are less productive compared to crossbred sows, as they have smaller litter sizes. Crossing two purebreds to create a cross has been proven to increase litter sizes and litter weights. We hypothesized that litters from crossbred sires would have larger litter sizes and litter weights compared to purebred Duroc sires. Sows and gilts were bred randomly to a crossbred or Duroc boar. At farrowing, measures were recorded via visual observation and through use of a hand-held scale. Birth weight of piglets from Duroc sires tended to be heavier compared to crossbred sires (3.4 vs. 3.1 pounds, $P = 0.08$). Litter weights however were reversed, as total litter weight from crossbred sires were heavier compared to Duroc sires (38.7 vs. 26.8 pounds, $P = 0.04$). Litter size was also significantly different, as litter sizes from crossbred sires were larger compared to purebred Duroc sires (13 vs. 8 piglets, $P = 0.04$). Breed did not impact number of piglets born alive ($P = 0.12$) or number of stillborn piglets ($P = 0.11$). Crossbred swine are generally more productive and therefore, more profitable. This project was supported by the MSU Undergraduate Research Fellowship program.

8:45 – 9:00 a.m. Arboreal and terrestrial lichen and bryophyte species richness in the Eagle Lake watershed, Rowan County, Kentucky

CS - 51

****Jesseca R. Dale, Jenna E. Slone, Dr. Allen Risk, mentor, Department of Biology and Chemistry, College of Science***

A lichen is a symbiotic relationship between algae and fungi. Bryophytes are non-vascular plants consisting of mosses, liverworts, and hornworts. These organisms can conduct photosynthesis, indicate pollution, provide building material for animals, and can be locally diverse in a forest. Two 20 X 20 m plots were established to assess arboreal and terrestrial lichen and bryophyte species richness in the Eagle Lake watershed. A white oak was chosen to center each plot and doubled rope technique was used to access the trunk and crowns of understory and overstory trees. Samples were collected from soil, rocks, woody debris, understory shrubs/trees, and a single overstory tree within each plot. Preliminary results for the arboreal zone, in study plot 1, consisted of two liverwort, five moss, and 14 different lichen species. The terrestrial zone consisted of 10 liverwort, 21 moss, and 34 lichen species. The preliminary data for the arboreal zone, in study plot 2, consisted of one liverwort, seven moss, and 12 lichen species. The terrestrial zone supported one liverwort, 17 moss, and 13 lichen species. Future data will include establishing more study plots in the Eagle Lake watershed. This research was supported by an Undergraduate Research Fellowship and the Pryor Fund.

9:00 – 9:15a.m.

Dendroclimatology of the Eagle Lake watershed, Rowan County, Kentucky

CS - 52

***Katherine DeBurger, Lyndsey Green, Dr. Allen Risk, mentor. Department of Biology and Chemistry, College of Science**

Forests are critical ecosystems that improve air and water quality, provide natural flood control and habitats that promote biodiversity. Forests also contain many resources for human use, such as lumber and pharmaceutically useful substances. Thus, the relationship between environmental variables and forest growth is an important area of inquiry. Dendroclimatology is the study of the relationship between annual tree ring growth and climatic variables, such as temperature, precipitation, and drought. In order to assess this relationship, four 20x20 meter plots were randomly located within the Eagle Lake watershed. Two samples were taken using an increment borer, from each tree over 10 cm in diameter at breast height (DBH). Each core was dried, glued to a mount and sanded to expose the individual rings. After comparing the samples to determine their age, the rings were measured using a Velmex measuring system. Future work will include quality control methods with COFECHA, and standardization of ring widths with ARSTAN. Correlation analysis will be used to examine the relationship between the local climate data and standardized widths of each tree ring. A special thanks goes to the Pryor Fund for supporting the project.

9:15 – 9:30 a.m.

Growth, reproduction, and habitat use in a clear-stream minnow, the Bigeye Shiner

CS - 53

***+Matthew Fossett, Jon Eisenhour, Dr. David Eisenhour, mentor, Department of Biology and Chemistry, College of Science**

The Bigeye Shiner (*Notropis boops*) occupies clear, rocky streams in much of the Midwest and Appalachian highlands, but has recently declined in many areas. Despite its recognition as a sensitive species, little ecological data have been published, which are needed to make conservation management decisions. We studied growth, reproduction, and microhabitat of the Bigeye Shiner for eight months in Triplett Creek. Length frequency analysis showed Bigeye Shiners averaged 38 mm SL at 12 months and 52 mm SL at 24 months. Examination of gonad development from monthly samples taken March through November showed sexually mature individuals were 38-56 mm SL. These mature individuals were in the 1+ and 2+ age classes, according to age assignments based on length frequency analysis and scale annuli counts. Females had 52-259 (mean=177) advanced mature to ripe ova per ovary. Analysis of gonadosomatic indices suggests spawning occurs May through July. Principal component analysis of microhabitats indicates Bigeye Shiners occupy calm water immediately adjacent to faster current, over heterogeneous substrates of sand and gravel, often with *Justicia* or woody cover. We suspect this location allows them to capture drifting insects while reducing swimming costs. This research was funded by grants from the Biology and Chemistry Department.

9:30 – 9:45 a.m.

Holistic review of developing a cell culture system to investigate the effects of microgravity on cytoskeletal remodeling in smooth muscle

CS - 54

****Danielle N. Gibson, Dr. Michael Fultz, mentor, Department of Biology and Chemistry, College of Science***

There are few studies that have examined the effect of microgravity on the cytoskeleton in smooth muscle. Although they conclude that the phenotype of smooth muscle may be gravity dependent, those that have been performed have utilized simulated microgravity. Therefore, the effect of microgravity on the cytoskeletal elements essential for force generation and maintenance in smooth muscle remains poorly understood. The effect of microgravity on the alpha-actin, beta-actin, and myosin components of the cytoskeleton in resting and contracting A7r5 smooth muscle cells is the primary research focus. Collaboration between the Department of Biology and Chemistry, SpaceTango (Lexington, KY), and the Craft Academy for Excellence in Science and Mathematics, has resulted in a redesign of a cell culture system that will allow for the culture, visualization, stimulation, and subsequent fixation of A7r5 cells aboard the International Space Station (ISS). Previous designs were limited by power availability and a few technological mishaps that have been reworked for installation within TangoLab on the ISS, which will be reviewed. Upon return to Earth, components of the cytoskeleton will be examined by fluorescent microscopy to investigate if microgravity alters the characteristic remodeling observed on Earth.

9:45 – 10:00 a.m.

Woody plant community composition of Eagle Lake forest, Rowan County, Kentucky

CS - 55

****Krystiana Hutchinson, Dr. Allen Risk, mentor, Department of Biology and Chemistry, College of Science***

Woody plant community composition was determined for the overstory, understory, sapling, and seedling layers by setting up five 20m x 20m randomly located plots within the forest. To measure species composition in each plot, three random 3m x 3m subplots for seedlings, and three random 5m x 5m subplots for saplings, were analyzed. Red maple had the highest importance value of 0.84, for the understory and overstory layers combined. Importance values were also calculated for co-dominant, intermediate, and overtopped species separately. For co-dominant species, white oak and red maple had the highest importance values of 0.76 and 0.63, respectively. Red maple had the highest importance values for both the intermediate (1.26) and overtopped (0.97) layers. Red maple also had the highest importance value of 0.80 for seedlings. Sourwood and red maple had the highest importance values of 0.50 and 0.45, respectively, for saplings. Due to red maple being the most abundant species in the seedling, sapling, and understory layers, suggests red maples may progress to dominate the overstory layer in the future. This research was supported by an MSU Undergraduate Research Fellowship and the Pryor Fund.

10:00 – 10:15 a.m. Comparison of epiphyte biodiversity of understory and overstory trees in Eagle Lake watershed, Rowan County, Kentucky

CS - 56

****Jenna E. Slone, Jesseca R. Dale, Dr. Allen Risk, mentor, Department of Biology and Chemistry, College of Science***

Does the canopy position of trees affect the biodiversity of tree epiphytes? Epiphytic organisms, such as bryophytes and lichens, are rarely represented in surveys of ecological biodiversity and are sensitive to a variety of microclimatic factors. To determine the answer to this question, two 20 m by 20 m plots were established in the Eagle Lake watershed near Morehead, Kentucky. These plots were centered around a codominant white oak (*Quercus alba*). The overstory white oak and three understory trees were sampled for all bryophyte and lichen species in five meter intervals using climbing equipment. Researchers anchored their ropes in the branches of the central white oak and gained access to upper trunks and crowns of surrounding trees using doubled rope technique. Samples of epiphytes were collected using wood chisels and limbs were removed with a hand saw for later examination. These samples were brought back to the lab and identified using dissecting microscopes, compound microscopes, UV tests, and chemical tests. The samples were categorized into species from understory trees and overstory trees to determine if a correlation exists between forest canopy position and epiphyte species richness and composition. This research was supported by Undergraduate Research Fellowship and the Pryor Fund.

10:15 – 10:30 a.m. Break

10:30 – 10:45 a.m. Determination of caffeine in water sources in Morehead, Kentucky

CS - 57

****Melanie West, Dr. Brandon VanNess, mentor, Department of Biology and Chemistry, College of Science***

One of the major environmental challenges which necessitates attentive monitoring focuses on contaminants in different water sources around the world. Some examples of compounds that are polluting waters include pharmaceuticals, oil, byproducts from factories, and specifically, caffeine. The concentration of this work is to determine if there is a presence of caffeine in water sources in Morehead, Kentucky by primarily using solid phase extraction techniques.

10:45 – 11:00 a.m. The Lunar IceCube mission: Systems, safety, and quality engineering

CS - 58

****Kristen Ammons, Katerina Winters, Dr. Benjamin Malphrus and Eric Thomas, mentors, Space Science Center, College of Science***

In late 2019, the most powerful rocket to date-- the Space Launch System (SLS) EM-1-- will be launched by NASA with 13 secondary payloads in the form of 6U CubeSats (satellites about the size and shape of a shoe box). Among these payloads is Morehead State's Lunar IceCube, a science mission designed to observe water ice deposits on the Moon. In developing this mission, it is very important to adhere to NASA-defined standards for the satellite to perform its mission and in order to keep the satellite from harming the SLS and other payloads. Processes and activities in safety, systems, and quality engineering ensure that the satellite meets every one of NASA-defined requirements. Using numerous government databases, NASA documents, and data processing tools, the team is developing control plans and gathering material information to meet required checkpoints, such as Safety Data Packages and the Critical Design Review, to ensure that Lunar IceCube will achieve its certificate of flight readiness. Future work entails quality assurance during integration and assembly of the spacecraft.

11:00 – 11:15 a.m. Hydrocarbon potential of the Berea Sandstone in eastern Kentucky

CS - 59

****Tanner Carroll, Dr. Steven Reid, mentor, Department of Earth and Space Science, College of Science***

In eastern Kentucky, the Berea Sandstone is a shallow hydrocarbon reservoir prone to both oil and gas. Lower drilling costs and high potential for profit have made the Berea the largest oil producing play in the state for the last few years. The purpose of this study is to determine the hydrocarbon potential of the Berea Sandstone in a portion of Eastern Kentucky.

Four types of subsurface contour maps of the Berea Sandstone were constructed in the study area. The mapped area includes all or parts of the Kermit, Milo, Webb, Inez, Naugatuck, Thomas, Varney, and Williamson, Kentucky 7.5-minute quadrangles. Well data was downloaded from the Kentucky Geological Survey oil and gas well database. Over four-hundred well logs were interpreted to determine: 1) sub-sea tops, 2) isopach thickness, 3) hydrocarbon net pay, and 4) formation porosity (Phi-h). Contour maps corresponding to each data type were constructed. The maps produced for this study typically are used in the oil and gas industry to identify potential plays, individual prospects and to maximize production. Interpretation of maps from the study area suggest favorable exploration/development targets and sheds light on stratigraphic and diagenetic controls on reservoir quality.

11:15 – 11:30 a.m. Fungal palynomorphs along the Paleocene-Eocene Thermal Maximum in Bastrop, Texas

CS - 60

****Kristina F. Gardner, Christopher N. Denison², Thomas D. Demchuck³, Dr. Jennifer M.K. O'Keefe¹, mentor, ¹Department of Earth and Space Science, College of Science, ²Astra Stratigraphics, Bastrop, TX, ³RPS Group, Houston TX***

Palynological analysis of upper Paleocene-lower Eocene sediments exposed in and near Bastrop, Texas, was undertaken to determine whether the variety and quantity of fungi reveal environmental changes across the Paleocene-Eocene Thermal Maximum (PETM), and if the fossil fungal assemblages are comparable with modern assemblages in tropical regions in either North or South America. Samples were collected from the Red Bluff and Golf Course exposures of Sabinetown and Carrizo formation siliciclastics. Palynomorphs, including pollen, plant spores, fungal remains, and algal remains, were recovered, identified, photographed, and counted. Plant and fungal taxa present have close similarity to taxa in South American palm savannahs and tidal flat environments. Within this environmental signal, evidence for herbivores in the region can be comes from the distributions of *Ascobolus* sp. and *Delitschia*-type fungal spores, while spores and conidia of known salt-marsh saprophytes, such as *Atrotorquata lineata* and *Lacrimasporites* sp. occur, especially in the Sabinetown. While the environmental signal is dominant, biostratigraphic indicators, primarily the occurrence of *Platycarya* sp. and co-occurrence of *Cicatricosisporites* sp. and *Apectodinium* sp., indicate that the PETM is likely below the studied horizons.

11:30 – 11:45 a.m. Ground operations support for the JPL ASTERIA Mission

CS - 61

****Toby Gedenk, *Chloe Hart, Alex Roberts, Drs. Robert Kroll and Benjamin Malphrus, mentors, Space Science Center, College of Science***

ASTERIA (Arcsecond Space Telescope Enabling Research in Astrophysics) was deployed from the ISS on November 20, 2017. It's mission is to achieve arcsecond-level line-of-sight pointing error and highly stable focal plane temperature control. The developers of this spacecraft are part of JPL's Phaeton Program. Morehead State University's Space Science Center was contracted to provide spacecraft tracking, telemetry, and control services to the Mission Operations team at JPL. The Space Science center's Ground Operations team, which consists of Sarah Wilczewski, Toby Gedenk, Chloe Hart, and Alex Roberts, uses advanced technology consisting of highly sensitive RF front ends, fiber optics, SDR software, an Amergint transceiver, and MSU's own 21-Meter Space Tracking Antenna to perform these services. The team has performed over 200 passes since spacecraft deployment. ASTERIA's 90-day prime mission was successful. The spacecraft continues to operate nominally and MSU has now entered an extended contract. In this presentation the team will provide an overview of the ASTERIA mission, the mission operation processes, and the ground station Architecture.

11:45 – 12:00 a.m. Break

12:00 – 12:15 p.m. Development of a simple method to detect Cesium 137 in soil

CS - 62

****Clayton Gullett, Dr. Steven Reid, mentor, Department of Earth and Space Science, College of Science***

Since 1945, intermittent, global fallout of ^{137}Cs (Cesium 137) from nuclear and thermonuclear weapon tests and from nuclear reactor disasters has occurred. Since Cesium 137 is only produced by nuclear fission, its intermittent presence in soil profiles corresponds to periods of active testing or reactor accidents. The objective of this thesis is to test whether two spikes in fallout from extensive nuclear testing in 1958 and 1963 are detectable in Morehead, Kentucky using a Mazur PRM-9000 Handheld Geiger Counter. Five cut-bank exposures of soil, apparently undisturbed since the late 50s, were selected in the Morehead area. At each site, the Geiger counter was held for a five-minute interval against exposed soil at 5 cm intervals over a depth of 50 cm. Soil samples were collected at both 5 and 10 cm intervals. Soils samples were re-analyzed in the lab using longer count-times than used in the field. Preliminary results suggest that the field readings may show spikes of Cesium 137 radiation, however, lab measurements show very small changes with depth.

12:15 – 12:30 p.m. Swift observations of the narrow line Seyfert 1 galaxy RX J0134.2-4258

CS - 63

****Sierra Hauck, Dr. Dirk Grupe, mentor, Department of Earth and Space Science, College of Science***

In my talk I will present results from Swift and XMM observations of the Narrow Line Seyfert 1 (NLS1) active galactic nuclei RX J0134.2-4258. Swift monitoring was performed between 2007 and 2015 in X-rays as well as in the Ultraviolet.

This source was previously observed by the ROSAT satellite in the 1990s, where it had one of the softest spectra observed by the satellite. It was believed that the small black hole's high accretion rate may have destroyed its corona through radiation-driven outflows, and that the corona would recover over the following years leading up to the beginning of SWIFT's observation of the source. In addition we will also present the X-ray observations performed by XMM in 2008. Possible models to explain the observations will be discussed.

12:30 – 12:45 p.m. Attitude modeling of the science orbit operations and implications for Lunar IceCube

CS - 64

***+Kennedy Haught, Dr. Benjamin Malphrus, mentor, Space Science Center, College of Science**

While all three of the orbital phases of Lunar IceCube's travel leading up to the science orbit are equally essential to the success of the mission, the fourth phase, the science orbit, is integral to completing the mission's science objectives. Lunar IceCube is part of a fleet of 6U CubeSats studying the Moon as part of NASA's Exploration Mission 1 (EM-1) that will be launched to Earth escape aboard the Space Launch System (SLS) rocket. The focus of the mission is to collect data on the location and dynamics of water on the surface on the Moon in ice and vapor forms using an IR (infrared) spectrometer. Using NASA Goddard Spaceflight Center's Program 42 to model the science orbit allows preparation for meeting certain dynamic and control requirements throughout the seven hour orbit. These requirements include accurately pointing the spacecraft toward the Sun, Earth, Moon, and in the anti-Lunar nadir direction in order to charge the batteries, communicate with MSU's 21 M Space Tracking Antenna integrated with NASA's Deep Space Network (DSN), scan the Moon using the IR spectrometer, and calibrate the star tracker while cooling the detector. Lunar IceCube is currently being designed and integrated at MSU's Space Science Center funded by NASA's Advanced Exploration Systems.

12:45 – 1:00 p.m. Pollen and fungal spores in Holocene Terrace Deposits: Evidence for ecosystem change following the Medieval Warm Period

CS - 65

***Emma C. Marriner¹, Kristina F. Gardner¹, Noelia B. Nuñez Otaño (mentor)^{1,2}, Dr. Jen O'Keefe, mentor¹, ¹Department of Earth and Space Science, College of Science; ²Facultad de Ciencia y Tecnología (FCyT), Universidad Autónoma de Entre Ríos (UADER), Km 10,5, RP11, Oro Verde, 3100, Argentina**

Holocene Terrace Deposits in Eastern Kentucky are a rich source of paleoecological information and are being studied to explain how plant ecosystems have changed in the 600-year interval from the end of the Medieval Warm Period, through the Little Ice Age (LIA), to the modern era. Previous work concentrated on deposits in the North Fork of Triplett Creek watershed (i.e., the Boudreaux Bend Beds); the current study extends this to the Big Brushy and Flat Fork of Tygarts Creek watersheds. While macroscopic plant fossils are rare in these deposits, charcoal and palynomorphs, especially plant pollen and spores and fungal remains, are common. The present study uses a combination of charcoal distributions and palynomorphs, especially fungal remains, to examine ecosystem change during the past 600 years. New results in part supports past findings that not only did changing climate impact plant communities, but so did land-use changes. Sediments in the upper two thirds of each site appear to have been deposited rapidly, with little time for plant or fungal colonization, while the basal sediments were deposited much more slowly. These sediments contain a diverse palynoflora that has similarities to the oldest flora preserved in the Boudreaux Bend Beds.

1:00 – 1:15 p.m. Swift observations of the unusual Narrow Line Seyfert 1 Galaxy Mkn 766

CS - 66

***Rebecca Mikula, Dr. Dirk Grupe, mentor, Department of Earth and Space Science, College of Science**

The Active Galactic Nucleus Markarian 766 (Mkn 766) is an extreme Narrow Line Seyfert 1 galaxy. Its black hole mass with just about 1 Million solar masses is small even for a NLS1. The X-ray spectrum is rather flat for this class of objects and considering its FWHM(H-beta) the [OIII] emission is very high and the FeII emission low. We had started an intense monitoring campaign with Swift on this object in 2007 together with ground-based optical photometry. Mkn 766 has been observed by Swift since a decade with irregular intervals. I will present first results from our analysis of the Swift X-ray and UV/Optical light curves.

Concurrent Session – 1st Floor Commons

Moderators: Dr. Ahmad Zargari and Dr. Susan Maxey

8:30 – 8:45 a.m. A deep Chandra x-ray observation of the nearby spiral galaxy NGC 7793

CS - 67

**Mitchell Nichols, Dr. Thomas Pannuti, mentor, Department of Earth and Space Science, College of Science*

We present an analysis of a deep (four pointed observations with a total exposure time 190.32 kiloseconds) observation of the nearby spiral galaxy NGC 7793 with the *Chandra* X-ray Observatory. With its face-on orientation, elevated star formation rate and proximity to Earth (based on its estimated distance of 3.91 Megaparsecs), NGC 7793 is an attractive target for the study of the endpoints of stellar evolution (namely supernova remnants and X-ray binaries) in a spiral galaxy. Furthermore, the high angular resolution capabilities of *Chandra* (approximately 1 arcsecond at 1 keV) make it well-suited for searches for X-ray counterparts to sources detected at other wavelengths. We have reduced the datasets from the *Chandra* observations using the CIAO software package and we detect over 50 discrete X-ray sources within the optical extent of the galaxy to a limiting unabsorbed luminosity of 10^{36} ergs/sec over the 0.5 to 7.0 keV energy range. We have also performed a spatial and spectroscopic X-ray analysis of the unusual extended source N7793-S26 which has been classified as either a super bubble or a microquasar: we have drawn upon new radio observations made of this source with the Very Large Array as part of our investigation into its properties.

8:45 – 9:00 a.m. A spatially-resolved x-ray spectroscopic analysis of the luminous northeastern rim of the galactic supernova remnant W28 (G6.4-0.1)

CS - 68

**Sarah Norris, Dr. Thomas Pannuti, mentor, Department of Earth and Space Science, College of Science*

We present a spatially-resolved spectroscopic analysis of the X-ray luminous northeastern rim of the Galactic supernova remnant (SNR) W28 (G6.4-0.1) using a pointed 50 kilo-second observation made with the *Chandra* X-ray Observatory. This SNR is well-known for its strong interaction with adjacent molecular clouds located along its northern and eastern borders, as indicated by the detection of hydroxyl (OH) masers. The northeastern rim of W28 is an intriguing morphological feature of the SNR: a large concentration of OH masers have been detected just east of this rim and the spatial distribution of these masers mirrors the morphology of the rim in a striking manner. We have divided the rim into twelve different regions and conducted spectroscopic analysis of each region to search for spatial variations in the rim's X-ray emission. The spectra were all fit simultaneously and successfully with the VAPEC model, which assumes that the X-ray emitting plasma is in collisional ionization equilibrium. The mean fitted temperature of the regions and the fitted elemental abundances of neon, magnesium and iron indicate that the X-ray emission is dominated by swept-up material. We also investigate the physical conditions that facilitate the creation of the high concentration of detected OH masers.

9:00 – 9:15 a.m. Implementation of the SPICE observation geometry system on the Lunar IceCube mission

CS - 69

****Jacob Schabert, Dr. Benjamin Malphrus, mentor, Space Science Center, College of Science***

In remote-sensing planetary science missions, understanding the observational geometry of the mission is exceptionally important in achieving the science goals. Without this information, the scientists would have a set of data with no feasible method of correlating it with a physical point for future reanalysis or practical applications. To meet this requirement, NASA JPL's Navigational and Ancillary Information Facility (NAIF) has developed and supported a data system and set of tools called SPICE. To meet its science requirements, SPICE is being used by Lunar IceCube as its basis for ancillary information to provide context to the Lunar IceCube science data. Lunar IceCube is a CubeSat developed by Morehead State University in partnership with NASA Goddard and JPL. It is one of the thirteen CubeSats selected to launch as a secondary payload on Exploration Mission 1 (EM-1) the first launch of the Space Launch System. This research was funded in part by NASA Space Grant and the Hal Rogers Undergraduate Fellowship for Space Science.

9:15 – 9:30 a.m. Thermal Freetop - A free, open source spacecraft thermal analysis package

CS - 70

****Yu Tso, Jeffrey Andrew Kruth, mentor, Space Science Center, College of Science***

Thermal Desktop is a powerful spacecraft thermal analysis software tool system in that is able to simulate the space thermal environment. However, it is expensive, requires a license and there are many details to be careful of in the process of building the model. Users always spend most of their time learning the software rather than performing the thermal analysis. The objective of this project is to develop a user-friendly, intuitive and reliable free open source spacecraft thermal analysis package which is open to individuals who are interested in spacecraft thermal analysis.

9:30 – 9:45 a.m. Development of a monitor data system for the 21 Meter Space Tracking Antenna: Upgrade to deep space network compatibility

CS - 71

****Sarah Wilczewski, *Maria Lemaster, Drs. Benjamin Malphrus and Charles Connor, Jeffrey Kruth and Robert Kroll, mentors, Space Science Center, College of Science***

The Deep Space Network is a network of large aperture ground stations, operated by NASA's Satellite Communications and Tracking Network, to track all satellites that travel beyond Earth Orbit. Time on the Deep Space Network is highly in demand and the demand increases every year. To handle this increased demand, the 21-meter Space Tracking Antenna at Morehead State University is being upgraded to become an auxiliary node on the Deep Space Network. The upgrade includes adding a Network Monitor and Control system. When tracking spacecraft, the Deep Space Network provides data about the status of the ground station, including antenna pointing, local weather, signal to noise ratio, receiver and transmitter performance, and more. This monitor information is used to ensure that the station is working properly, and to diagnose any problems, such as a loss of spacecraft carrier, that might arise during a pass. A pre-existing open source software toolset called Open MCT is being leveraged to collect and display the monitor data received from the 21-meter antenna monitor system under development. The Network Monitor and Control system being developed will be used by all future users of the Deep Space Network Node at Morehead and will serve as a baseline for any outside antennas that get added to the Deep Space Network in the future.

**9:45 – 10:00 a.m. Long-term monitoring of night sky brightness on the campus of
Morehead State University**

CS-72

****James Blackburn, Dr. Jennifer Birriel, mentor, Department of
Mathematics and Physics, College of Science***

The use of artificial light at night increases night sky brightness above natural levels, causing a phenomenon known as light pollution. Light pollution has negative ecological and economic consequences and yet it can easily be remedied. The first step to addressing light pollution is to quantitatively document night-sky brightness and compare it to natural levels of night sky brightness. In 2010, an ethernet enabled Unihedron Sky Quality Meter was installed on the roof of Lappin Hall. This device makes photometric measurements of night brightness. Nightly monitoring reveals changes in sky brightness with natural phenomena such as lunar phase and night sky cloud cover. We report on recent measurements under a variety of sky conditions, including clear, moonless nights, clear full moon nights, and overcast nights. Overcast nights display amplification of light pollution, in agreement with other studies. We also discuss the many problems encountered in maintaining the device's operation over the years. This research was supported by an MSU Undergraduate Research Fellowship.

**10:00 – 10:15 a.m. Automatic triangulation: Creating meshes from a set of vertices by using
greedy minimum-perimeter triangulation algorithm**

CS-73

****Cory R. Broadwell, Dr. Michael Dobranski, mentor, Department of
Mathematics and Physics, College of Science***

A mesh in computer science is a set of triangulated points in Euclidean space. A triangulation on a set of points is the mapping of triangles over those points such that there are no overlapping triangles and each point is used in at least one triangle. Using Unity Game Engine, we are able to draw objects using the triangulated points, such as a skeleton rendering with just vertices and triangles. In Unity, these points are stored in a vertex list and the corresponding triangles in a triangle list. In order to model realistic humans using deformable meshes, one can first start by looking into automating the triangulation process. We automate the triangulation process using a greedy minimum-perimeter triangulation algorithm we designed: a point inside the vertex list is taken then connected to two other points in the list by minimizing the perimeter of the triangle. We later found out that this method of triangulation is a small part of Minimum-Weight Triangulation problem, which asks to find the minimum perimeter of all the triangles not minimizing each subsequent triangle. This research was made possible thanks to Unity Game Engine.

10:15 – 10:30 a.m. Break

**10:30 – 10:45 a.m. Night sky brightness measured in the RGB color bands using unihedron
SQM-DL devices**

CS-74

****Trey Fultz, Dr. Jennifer Birriel, mentor, Department of Mathematics and
Physics, College of Science***

LEDs are quickly becoming the light source of choice for street lamps due to their energy efficiency and luminous output. However, blue light, which largely makes up the light output of LEDs, has been shown to have adverse effects on circadian rhythm and melatonin production in both animals and humans.. Blue light also scatters more effectively than other wavelengths of light: this makes LED street lamps more harmful due to excess scattered light and glare. Here, we present our portable bank of 4 detectors which monitors light in three color bands: clear, red, green, and blue. Our original set of detectors suffered the effects of weathering and we discuss these problems. We also assembled a second bank of detectors, obtained through a grant from the Fund for Astrophysical Research in early 2017: this set saw "first light" during the middle of March. The detectors were placed on the roof of Lappin Hall and each collected measurements of night sky brightness every five minutes. We discuss our results for data from March 15 to March 27, 2017 and its implication for the spectral signature of the night sky resulting from the use of artificial light on the MSU campus. This work was supported in part by a grant from the Fund for Astrophysical Research.

10:45 – 11:00 a.m. **Optimization in rock climbing**

CS - 75

****Emily Gindlesperger, Dr. Timothy O'Brien, mentor, Department of Mathematics and Physics, College of Science***

For most people, rock climbing has always been about the fun and the challenge that come with finding your way to the top of a climbing wall. In this presentation, we will apply graph theory to obtain an optimized path on a rock climbing wall. We define the optimized path to be the path with the fewest number of moves. We will discuss the process used to obtain the optimized path, including converting the wall into a graph and using a computer program to apply Dijkstra's Algorithm, and how to interpret the results.

11:00 – 11:15 a.m. **The mathematical and philosophical implications of the Banach-Tarski paradox and other paradoxes of infinity**

CS - 76

****Kyle Layne, Dr. R. Duane Skaggs, mentor, Department of Mathematics and Physics, College of Science***

Originally published in a 1924 paper by Stefan Banach and Alfred Tarski, the Banach-Tarski paradox proves that a solid sphere in three-dimensional space can be decomposed into a finite number of pieces and that those pieces can be rearranged to form two distinct solid spheres, both identical in size, density, etc. to the original. This is perhaps the most bizarre result of Zermelo-Fraenkel Set Theory, or even in all of mathematics, and raises serious questions about our understanding of infinity and our ability to use mathematics to predict the natural world. This project will address the mathematics which allowed for such a counterintuitive conclusion to arise and observe the implications of this theorem on later mathematics and philosophy.

11:15 – 11:30 a.m. **Estimating orbital lifetime**

CS - 77

****Ian Ray, Dr. Michael Dobranski, mentor, Department of Mathematics and Physics, College of Science***

Satellites in Low Earth Orbit (LEO) are primarily under the influence of two forces: gravity (from Earth) and friction (drag due to the atmosphere.) The effect of drag is difficult to model, frictional forces are non-conservative and typically non-linear. The resulting equations of motion are rather complicated, and generally not analytically solvable. Fortunately, for the purpose of determining a satisfactory range of possible Orbital Lifetimes for a cube-sat, analytic solutions are not necessary. The subject of this research is to develop a variety methods for making such estimates. This research was supported by Morehead States Space Science Center and Sonoma State University.

11:30 – 11:45 a.m. **Using the sport of soccer to study projectile motion**

CS - 78

****Zack Roe, Dr. Ignacio Birriel, mentor, Department of Mathematics and Physics, College of Science***

A basic problem in all physics class is projectile motion and the use of kinematic equations. In this study we designed and built a machine that uses two electric motors to "shoot" soccer balls. We are able to examine how different angles with respect to the ground and rpms, from the electric motors, effect the distance, velocity and spin of the ball. Video analysis software, Tracker, was used to record the ball's velocity and acceleration with respect to position as the ball traveled from the machine to the point of impact. The data allowed us to write a program in C++ that can predict distance, time of flight and velocity when given the angle with respect to the ground and the rpms of the electric motors.

11:45 – 12:00 p.m. *Break*

12:00 – 12:15 p.m. **Game of theory: A mathematical analysis of Game of Thrones**

CS - 79

****Rachel Simpson, Dr. Vivian Cyrus, mentor, Department of Mathematics and Physics, College of Science***

Many people around the world are watching HBO's Game of Thrones and trying to decide who will survive. Game Theory is based on probabilities and the creation of payoff matrices in order to analyze a player's best strategy to receive the highest possible payoff. Using Game Theory is a mathematical way to determine the outcome of who will beat the other characters and rule the seven kingdoms at the end of the series. This is done by exploring multiple games and setting each of eight key characters against each other in a tournament. Creating games for this type of show is not simple, therefore using both zero and non-zero sum games with different numbers of strategies will provide a better analysis.

12:15 – 12:30 p.m. **Calculating cardiac output using the dye dilution method and how other methods compare to it**

CS - 80

****Cameron B. Stephens, Dr. Vivian Cyrus, mentor, Department of Mathematics and Physics, College of Science***

Calculating and comparing different methods of finding Cardiac Output, including invasive and non-invasive techniques to see how accurate they are. I gathered information from Pikeville Medical Center of right heart catheterizations of 14 patients and will be comparing the Dye Dilution method and the methods they use in many hospitals to calculate Cardiac Output. So far in my research I have found that when using The Dye Dilution Method the results are more accurate than other methods.

12:30 – 12:45 a.m. **Nylon or steel?**

CS - 81

****Tanner Tackett, Dr. Ignacio Birriel, mentor, Department of Mathematics and Physics, College of Science***

The purpose of my project was to interpret the difference in nylon and steel guitar strings. A standard hollow body six-string guitar was used for each of the two sets of strings. A chromatic tuner was used to collect the frequencies of the various notes. A Fourier analysis of various chords was recorded using the Vernier LoggerPro software to compare the two sets of strings. In this presentation we will show that some things may sound the same, but may not look the same.

Poster Session

1:15 – 3:00 p.m. Button Drill Room

P - 1

Journey through everyday e-textiles: A hands on approach

****Haylee Mitchell, *Nadia Richardson, Dr. Carol Christian, Craft Academy for Excellence in Science and Mathematics***

In most classroom settings students are being taught to memorize general information rather than applying that information in a creative real-world situation. Research shows that students benefit from teachers in STEM fields implementing Project Based Learning into the classroom. Through implementing this technique, it enables students to unlock the highest level of Bloom's Taxonomy; application of knowledge. When Project Based learning is implemented into the classroom at a middle school level, it allows more students to realize their potential in the STEM fields. Research supports the idea that effectively implementing this strategy can be a challenge, but when a method to planning activities is in place using Project Based Learning becomes attainable.

P - 2

An evaluation of strategies used to invite participation in ethics training

****Nicole Bennett, Dr. Johnathan Nelson, mentor, School of Business Administration, College of Business and Technology***

Recent ethical scandals have caused there to be more attention on organizations and how they manage ethical behavior, including through ethics training. Ethics training focuses on what motivates employees to behave and work ethically. The purpose of this research is to identify characteristics of invitations to ethics training that make employees more apt to complete the training when it is not required. Invitations to ethics training are one important influence on employee motivation related to ethics training. Specifically, we hypothesized that when ethics training is framed as a values versus compliance program, and when communications about ethics training emphasize the ability of people to change, that people will be more likely to complete ethics training and perceive it as more effective. We tested these hypotheses in a two by two experimental design to test all four conditions. We present our results and provide a discussion of how ethics training can be advertised and communicated to employees to motivate their completion and participation in ethics training to improve its effectiveness. This research was supported by the MSU Undergraduate Research Fellowship Program.

P - 3

The perception of black student-athletes' and non-athlete students' learning experiences at a predominately white public institution

****+Erin Blaine, Dr. Steve Chen, mentor, School of Business Administration, College of Business and Technology, Dr. Daryl Privott, mentor, Foundational and Graduate Studies in Education, College of Education***

Past literature indicated African-American minority students, particularly male student-athletes are often stereotyped and experienced discriminatory treatments in their institution (Brook et al, 2013; Carter-Francique et al., 2013; Littleton, 2003). This study examined African-American students' learning experience at a regional public university in Appalachia for the purpose of improving the existing academic support services and creating a safe diverse learning environment for racial minority students. The respondent included 92 black students (42 males, 50 females) with 65% were upper-division classmen and 33% were student-athletes. They completed a self-created 33-item survey that covered 22 five-point scale questions (with seven constructs, 1 = strongly disagree and 5 = strongly agree), four open-ended questions, seven questions related to demographic information (i.e., gender, major, class level, and student-athlete status). The seven constructs reflecting students' experience addressed areas such as: (1) academic concerns and support, (2) sense of neglect, (3) athletic identity, (4) opinions from other individuals, (5) social involvement, (6) racial tension, and (7) food service. The results indicated student-athletes expressed a higher rating in racial tension and biased opinions from others. Recommendations for improving current services and ways for fostering an inclusive campus environment were further discussed.

P-4**Entrepreneurial intention: Born or bred?**

****Hunter Branham, Drs. Janet Ratliff and Johnathan Nelson, mentors,
School of Business Administration, College of Business and Technology***

The purpose of this research study was to identify whether Craft Academy students choosing an entrepreneurship track and being exposed to an entrepreneurship curriculum will possess greater levels of leadership and entrepreneurial intention than those students not choosing an entrepreneurship track. The study was conducted with 60 Morehead State University Craft Academy students (attending 2015-2017) with varying interests in STEM related fields. The +X side of the curriculum in the STEM+X is a special feature of the Craft Academy that broadens and enriches the student's educational experience. Entrepreneurship, creativity and design, and civic and regional engagement are the three choices within the +X side of the STEM+X curriculum. This distinguishes the Craft Academy from other Academies like it across the nation. The entrepreneurship curriculum was a sequence of five courses. Students selected the +X area of interest after exposure to all three in a First Year Seminar course in the first semester. The survey instrument used for this study was divided into related categories: demographics, leadership, entrepreneurship intention, careers and ethics. Research was supported by MSU Undergraduate Research Fellowship.

P-5**The role of high school GPA and ACT score and its components a predictor of college success**

****Thomas Curtsinger, Dr. S. Ali Ahmadi, mentor, School of Business
Administration, College of Business and Technology***

The purpose of this study was to investigate the relation between Student Success in college (Dependent Variable) with High School GPA as well as with the scores in different components of ACT test. A survey of 120 students was administered in which, in addition to demographic data, students MSU GPA, as well as their scores on ACT was solicited. A Multiple Regression model postulated Student Success (as determined by GPA as a function of their scores in ACT and High School GPA). The results are tabulated and reported. This research was funded with an Undergraduate Research Fellowship.

P-6**Student-athletes' perceptions of females serving as the head coach of competitive elite male sports**

****Christian Hensley, Dr. Steve Chen, mentor, School of Business
Administration, College of Business and Technology***

The recent coaching employment of Becky Hammon inspires the discussion of the potential of witnessing the first female head coach hired in men's professional basketball. Despite the presence of female leaders in many business and political realms, there is a lack of gender equality in the employment of female coaches in the male dominant sports. This study investigates how women are perceived as a head coach candidate in the male dominated sports based on 132 student-athletes' responses (70 males and 62 females). An exploratory factor analysis was performed to address four areas of responses: (1) confidence in female coaches' competency, (2) preferential level of female coaches, (3) female coaches' unique trait and strength, and (4) actual opportunities that females receive. In general, the respondents moderately agree that females have the adequate abilities and knowledge as male coaches do to handle the coaching tasks. However, males are not very comfortable about having a female head coach. In agreement with several findings, the researcher found that male athletes are more likely to show disrespect toward female coaches, and question their desire to win. Additional constructive strategies were provided to support future females overcoming the perceived barriers for becoming a head coach.

P-7

Machine learning and political orientation prediction

****Kenneth B. May, Dr. Ashraf Aly, mentor, School of Engineering and Information Systems, College of Business and Technology***

This project aims to address the phenomenon psychologists call “confirmation bias”, with respect to the American political landscape. Confirmation bias is the tendency for people to only seek out and consume information that reinforces, or at the very least that doesn't conflict with their existing beliefs. The goal of this project is to apply the principles of machine learning to develop an algorithm that can analyze a body of text (such as an article) and categorize it by political alignment. Once such an algorithm has been created and refined, a website will be created that will present users with articles that oppose their political views. The hope is that by exposing themselves to opposing viewpoints, instead of only reading articles and opinions that mirror their own, users will become more politically aware and informed.

P-8

Reflection for moral character development

****Carley Peca, Dr. Johnathan Nelson, mentor, School of Business Administration, College of Business and Technology***

Moral character is defined as the disposition of individuals to think, behave, and feel in an ethical manner and consists of attributes that facilitate personal well-being. These personal attributes (character strengths such as integrity and humility) are related to six different virtues: wisdom, courage, humanity, transcendence, justice, and moderation. Character-based leaders exhibit high ethical standards while also inspiring and developing the character of followers. Organizational leaders must develop high levels of moral character in order to maintain ethical behavior as well as gaining trust from subordinates. A better understanding of how character is developed will allow leaders and other organizational members maintain their moral integrity to avoid hypocrisy, and thus be more effective. Reflection has been identified as an important influence on character development. In this inductive study we used qualitative data to better understand the role of reflection in the character development process. Participants were asked to share their experiences related to moral character reflection. We present initial findings from this data to provide insight into when moral/character reflection occurs and how it facilitates character development. Implications for character-based leadership development will be discussed as implications. This research was supported by the MSU Undergraduate Research Fellowship Program.

P-9

An investigation of the mechanical properties of concrete with microfibers

****Jonathan Bowling, Dr. Sahar Ghanem, mentor, School of Engineering and Information Systems, College of Business and Technology***

Concrete is a material on which most structures are constructed. Beneath every stable structure is a solid foundation, one made of concrete. Concrete has the innate ability to withstand high compressive forces; however, it does not possess the same strength against tensile forces. To compensate for this lack of tensile strength, steel rebar is often used. In addition to steel rebar, the use of microfibers in the design of concrete are becoming a topic of interest. During this investigation two concrete samples are designed. One plain concrete sample and another reinforced with carbon microfibers. Samples are then put through various tests. Including tests for workability, compressive strength and tensile strength. The results of samples are compared. Utilizing the results of these tests can give us a better understanding of the effects of adding different microfibers to concrete. This done in the hopes of producing new innovations in the design of concrete. Innovations that will allow the use of better designed concrete for safer construction in the community. This research has been funded through an Undergraduate Research fellowship.

P-10

The utilization of mobile application technology

****Brooke Hall, Cameron Arthur, Connie Grimes, mentor, School of Engineering and Information Systems, College of Business and Technology***

The SpaceTrek Application is a mobile app for an all girls space camp called SpaceTrek. This app will connect the girls to technology from their application to their testimonials years later. In the application phase, the girls will be able to answer fun questions about themselves that their fellow campers will be able to see to get to know them better. This page will later be replaced with the testimonial page where the alumni will be able to keep up with each other after the camp. In addition to this, the app will allow for communication between the campers and the camp advisors through the linked social media. The social media connection will also enable the campers to post pictures of their favorite moments at SpaceTrek, which will act as advertisement for the camp. At the camp mentors, speak almost every day. This inspired another feature of The SpaceTrek application, which is the ability to store mentors' contact information. Our goal is to offer this app on both Google Play Store and The Apple App Store at the beginning of Summer 2018.

P-11

Design for reliability in hardware

****+Linya Shu, Dr. Kouroush Jenab, mentor, School of Engineering and Information Systems, College of Business and Technology***

Design for Reliability (DfR) concepts is formed by a set of tools and techniques used in Product Design/Development Life Cycle (PDLC). DfR has begun to receive a great deal of attention because of customer assurance, lowering life cycle costs. Due to heterogeneity of constituent DfR tools and techniques, this research reports a resource based model for measuring the achievement level of DfR implementation in PDLC. The model utilizes DfR and reliability metric to calculate the achievement level of DfR. The results depict how the resources should be distribute among DfR activities and to be tracked in order to meet reliability requirements.

P-12

Do energizers create positive behavior in the classroom?

****Gentry M. Arnold, Dr. Dan Grace, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

In this project, students in a regular education, fifth-grade classroom were presented with scheduled energizers/brain-breaks, in order to determine if it will have improved their attentiveness and behavior for six weeks. Least restrictive environment allows students of all ability levels to be present in the classroom. The Universal Design for Learning is a flexible framework that allows teachers to incorporate differentiated instruction to provide appropriate best practices for all students. Therefore, providing a systematic energizer throughout the day to improve attentiveness and behavior could be beneficial when planning and organizing for the classroom. During the first three weeks students participated normally in the classroom with the regular response to behavior. During the last three weeks of the study, students were asked to participate in daily energizers (or brain breaks) to see if the student's behaviors improved with the daily physical activity. Students behavior was measured by the school wide behavior plan.

P - 13

Behavior based on cooler vs. warmer temperatures in a special education setting

****Kennedy Blakeman, Dr. Kimberly Nettleton, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

Positive student behavior in the classroom is essential when creating a learning environment suited for individual learning. This research study was a collection of weekly data trying to find a connection between temperature and the behavior of students in a special education setting. Comparatively, nine students partook in their everyday schedule while the researcher altered the temperature weekly and recorded behavior patterns. After 7 weeks of observation, the researcher determined that cooler temperature has a positive effect on student behavior while warmer temperatures have a negative effect. Acknowledgment to the Rowan County School system for allowing the researcher to partake in this data collection while working together to create a successful learning environment for students in a special education setting.

P - 14

Letter learners: Teaching letter recognition to students with moderate and severe disabilities using constant time delay

****Christina Clarkson, Suzannah Chapman-Johnson, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

Systematic instructional strategies that have been used to teach academic skills to students with moderate to severe disabilities (Hemmeter, 2000) include the system of least prompts (Ault and Griffen, 2013; Manley, Collins, Stenhoof, and Kleinert, 2008), time delay (Hughes and Fredrick, 2006; Riesen, McDonnell, Polychronis, and Jameson, 2007), and simultaneous prompting (Riesen et al.). The purpose of this study was to explore if the use of constant time delay would be an effective instructional strategy to teach letter recognition to a 1st grade student with Autism in the elementary school setting.

P - 15

Teacher to teacher: Mentoring preservice teachers into the profession

****Brianna Cottrell, *Hayley Boyd, Dr. Kimberly Nettleton, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

The professional preparation programs for the education profession are being challenged to change the ways in which preservice teachers are trained. Collaborative partnerships between the university and local schools are developing. Currently, there is a heavy emphasis on establishing strong mentorships between experienced teachers and preservice teachers. How effective is mentoring? What are the lasting results? Are mentors better teachers once they have provided leadership and guidance to a preservice teacher or do they just pass on poor teaching skills? This study examined the question of how mentoring affects educators.

P - 16**Effectiveness of preschool attendance on later reading success**

****Kelli Gillum, Sharon Benton, Dr. Kimberly Nettleton, mentor,***
Department of Early Childhood, Elementary and Special Education,
College of Education

This research study was conducted with all 156 students at Tilden Hogge Elementary in first through fifth grade for whom data was available. The Fountas and Pinnell reading levels of each student were analyzed and sorted into categories: Significantly Above Level (one full grade level or more above expected), Above Level, On Level, Below Level, and Significantly Below Level (defined as one full grade level or more below expected). Then, early education enrollment of the same students was cross-referenced to determine if preschool attendance in early childhood had any effect on the later reading levels of the students. It was determined that there was no correlation between preschool attendance and elementary reading success. This lack of impact held true between the grade levels.

P - 17**Going on a word hunt: Teaching sight words using constant time delay**

****Katelyn Harvey, Suzannah Chapman-Johnson, mentor,*** Department of
Early Childhood, Elementary and Special Education, College of
Education

Various systematic instructional strategies have been used to teach academic skills to students with moderate to severe disabilities (Hemmeter, 2000). These strategies include the system of least prompts (Ault and Griffen, 2013; Manley, Collins, Stenhoof, and Kleinert, 2008), time delay (Hughes and Fredrick, 2006; Riesen, McDonnell, Polychronis, and Jameson, 2007), and simultaneous prompting (Riesen et al.). The purpose of this study was to determine if constant time delay would be an effective instructional strategy to teach sight word recognition to a 5th grade student with intellectual disability in the elementary school setting.

P - 18**Effects of positive reinforcement on emotional behavior disorders**

****Ashley Hess, Dr. Dan Grace, mentor,*** Department of Early Childhood,
Elementary and Special Education, College of Education

In this study, the effects of positive reinforcement on noncompliant subjects with Severe Emotional Behavior Disorders. The purpose of this study was to address an undesired behavior. Using a reward systems at 5 minute intervals, the effects were recorded and analyzed. By the end of the study, Subject A would earn at least one reward each day, which resulted in student success. Subject B rarely earned the reward each day. Thank you to Rowan County Schools and Clearfield elementary for allowing me to investigate my research project as well as Courtney Callis for allowing me to use her classroom.

P - 19**Classroom transitions**

****Paige Honaker, Sharon Benton, mentor,*** Department of Early
Childhood, Elementary and Special Education, College of Education

Many elementary classrooms have a hard time transitioning from one activity or subject area to another and lose academic time to transition time. Having effective transitions exemplify good classroom management and allow more time to spend on learning. There are many effective ways to transition in elementary classrooms. Research shows that an effective way to have elementary students transition is by using music or a song to which they can sing along. Students tend to stay more focused and on-task during transitions when there is some music or rhythm playing, which allows them to transition at a faster rate. The research was conducted with the help of Rowan County School District.

P - 20

Multiplication automaticity in the 4th and 5th grade

****Mary Claire Mahanes, Sharon Benton, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

According to data from the beginning of this study (weeks 1-3), many students could not compute multiplication facts automatically in the 4th and 5th grade. The goal of this study was to determine if daily practice of random multiplication facts would increase accuracy and automaticity. For seven weeks students were given a 3-minute, 50 question quiz of random multiplication facts. During weeks 1 through 3, students were not given daily practice time. During weeks 4 and 5 students received seven minutes of daily practice. During weeks 6 and 7 students received five minutes of daily practice. By the end of the study, students showed a 12 point increase in accuracy based on class average (from 29 out of 50 questions correct after week 1, to a peak of 41 out of 50 questions correct after week 6). Students used flashcards, partner practice, and computer games for review. This study happened thanks to the participation of Rowan County Schools.

P - 21

Teaching listening

****Megan Maynard, Sharon Benton and Dr. Kimberly Nettleton, mentors, Department of Early Childhood, Elementary and Special Education, College of Education***

A study was conducted to determine if teaching listening skills promoted better learning. In a local elementary second grade classroom, data was collected on student listening behavior before and after lessons on listening and the implementation of attention getting strategies. Baseline data showed that initially, students had low attention spans and did not focus on instruction. However, after teaching and implementing these strategies, student patience, attention span, and focus increased. Teaching listening can support all levels of learners and their comprehension of material. I acknowledge and thank Rowan County schools for support for the project.

P - 22

Rewards: Short term vs. long term

****Emily McLean, Sharon Benton, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

Reward systems have been a part of the classroom for many years. They have consisted of short term rewards that are given more often and long term rewards that require children to work towards getting rewarded over a period time. In a fourth grade classroom at a local elementary, student behavior was recorded when there was no promise of reward, when a short term reward was introduced, and when a long term reward was introduced. After collecting data over several weeks, it appears that children were more motivated when a short term reward was given to them. I would like to thank Rowan County Schools for supporting this project.

P - 23

Kindergarten readiness: Preschool vs. head start

****Elisabeth Minser, Dr. Dan Grace, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

Twenty-two kindergarten students were examined during this research. The students previously attended preschool, Head Start, or had no previous educational childcare before starting elementary school. This research was comprised of assessing students' readiness for kindergarten and their knowledge of letters before kindergarten instruction. The reading ability of the students was assessed by the Kindergarten Readiness Assessment that the students took before the school year started. From the data collected, students who attended preschool were more prepared for kindergarten. Students who did not attend either Head Start or preschool show data that those students were next group of students that were prepared for kindergarten. The table from the data shows that 73% of the students who attended preschool were ranked highly ready for kindergarten where 50% of the students who attended Head Start were ranked not ready for kindergarten.

P - 24

Beating the clock: A study on the effect of the use of a timer during restroom breaks

****Caitlyn Mullins, Dr. Kimberly Nettleton, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

The purpose of this study was to determine if the use of a timer during restroom breaks in a first grade classroom decreased the amount of time students spent at the restroom. For eight weeks, at intervals of every two weeks, students played a "beat the clock" game to try and beat one of their previous times. The first two week period students tried to "beat the timer", the length of time at the restroom decreased. For the remaining four weeks of the study, the average time spent at the restroom increased. These findings suggest that the use of a timer during restroom breaks for this first grade classroom was not effective in decreasing the amount of time students spent at this transition.

P - 25

Best practices for teaching reading to secondary students with a specific learning disability: A review of the literature

****Shelby Preston, Dr. Sherry Stultz, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

This literature review aims to showcase effective reading strategies to implement in a secondary reading program for students with a specific learning disability. The review also discusses ineffective strategies that practitioners should avoid in a secondary reading program. The results of this review support what students have learned in their literacy instruction for students with a specific learning disability methods course. This analysis of the current body of literature highlights the need for more research to determine the most effective secondary reading strategies for students with a specific learning disability at each grade level.

P - 26**Student behavior and time of day**

****Aubry Prow, Dr. Kimberley Nettleton, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

The purpose of this research was to explore how time of day affects student behavior. The teacher in the classroom uses a "clip chart" to monitor student behavior throughout the day. The clip chart from the bottom up shows: pink, purple, blue, green, yellow, orange, and red. All students begin at green, and clip up or clip down throughout the day based on behavior. The data was collected each day before lunch and at the end of the day after students went home. The data shows that students had fewer behavior problems in the first half of the day, than the second half. This project was supported by McBrayer Elementary in Rowan County.

P - 27**Pre-teaching ELL students sight words**

****Kristy Thompson, Dr. Kimberly Nettleton, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

In this case study, I used pre-teaching with two English Language Learners for increase in sight word recognition. This case study was conducted in a local first grade classroom. It was determined that constant repetition of sight words worked well for one ELL students instead of pre-teaching. Pre-teaching for the second student was very successful. The results for Student A showed an increase in identifying sight words from two words to thirty six words over the course of seven weeks; an increase of thirty-four words. The results for Student B showed an increase in identifying sight words from twelve words to forty nine words over the course of seven weeks; an increase of thirty-seven words. This project was fully supported by McBrayer Elementary School's first grade teacher.

P - 28**Student behavior's impact on transition time**

****Rachel Victory, Dr. Kimberly Nettleton, mentor, Department of Early Childhood, Elementary and Special Education, College of Education***

This research project focused on collecting data to determine if student transition time between classes is affected when students are aware they are being timed. In this study students in a 4th grade classroom were timed two times a week for seven weeks when transitioning from their homeroom classroom to their second teacher's classroom. During the first three weeks students were unaware that they were being timed to see how long it took them to transition from one classroom to the next. Weeks 4 thru 6 the students were aware that they were being timed while transitioning between the two classrooms. In the final week of the study the students were unaware they were being timed during transition. Based on the data collected it was found that the amount of time spent transitioning significantly decreased when the students were aware of being timed. Although the students didn't know they were being timed during the final week they were successfully able to continue to transition in a short amount of time.

P - 29

The effects of stamina reading on students' reading fluency

****Amanda Walden, *Lindsey Smith, Dr. Dan Grace and Sharon Benton, mentors, Department of Early Childhood, Elementary and Special Education, College of Education***

In this research study, reading fluency levels of two third grade classes were examined. One class participated in daily stamina reading for twenty minutes, while the second class participated in independent reading for twenty minutes a day. DIBELS reading fluency scores and curriculum based measurement data were collected over a period of one month. Results: The research showed no correlation between the reading fluency levels of students who practiced twenty minutes of stamina reading each day and the students who only read independently for twenty minutes each day. The students' DIBELS scores and curriculum based measurement tasks showed significant growth in both classes, but neither class showed more growth than the other.

P - 30

Doctoral program evaluation

****Lauren Myre, Dr. John Curry, mentor, Doctorate Studies, Department of Foundational and Graduate Studies in Education, College of Education***

The purpose of this research is to conduct a stakeholder based evaluation (Fitzpatrick, J. L., Sanders, J. R., & Worthen, B. R. (2011). *Program Evaluation: Alternative Approaches and Practical Guidelines*. Boston, MA: Pearson Education.) of Morehead State University's EdD, Doctorate of Educational Leadership, program. The purpose behind the evaluation is to determine the effect and the degree to which that effect is or is not having on the graduates of the program. The questions will be: Due to or after being involved in this program have they been able to change jobs, get promotions, are they satisfied? Through stakeholder interviews and focus groups, the researcher will help determine stakeholder satisfaction and benefits from participation in this particular program.

P - 31

6th through 12th grades engineering project: Turbine design

****Justin Elswick, Dr. Lesia Lennex and April Reefer, mentors, Department of Middle Grades and Secondary Education, College of Education***

Developing enthusiasm and creativity to resolve world energy problems is a dilemma facing educators. How can educators bring the excitement of real-world issues into their classrooms? What kind of affordable equipment can they use? This project seeks to develop materials and means through which Middle and High School students can creatively engineer solutions to existent problems. What kind of turbine, in a gravity-fed system, would generate the most energy? Results from an engineering thought survey and turbine energy production are presented in this session. This poster presentation was made possible via the Undergraduate Research Fellowship program.

P - 32**Elementary teachers' experiences using informational texts to teach social studies in eastern Kentucky**

****Kelsey Purdum, Dr. Kimberlee Sharp, mentor, Department of Middle Grades and Secondary Education, College of Education***

One component of the United States' public school curriculum core is social studies. Since the No Child Left Behind Act (2001), elementary social studies has been marginalized, and in some cases, eliminated from the school day in favor of increased time for literacy and mathematics instruction. Kentucky's adoption of the ELA Common Core standards in 2010 set in motion an opportunity to re-position social studies' status in the elementary school day. This opportunity, using *informational texts* for teaching reading, emphasizes nonfictional text material such as primary and secondary sources as well as other texts that inform about the natural and social world. This study seeks to understand whether the ELA Common Core is the impetus teachers need in order to revitalize social studies instruction in the elementary grades. This research was supported by MSU Undergraduate Research Fellowship.

P - 33**Photography practicum: Learning the basics of managing a fine art photography studio**

****Maggie Flanagan, Robyn Moore, mentor, Department of Art and Design, Caudill College of Arts, Humanities and Social Sciences***

The photography practicum provides Art and Design student researchers with the practical experience of managing a fine art photography studio. Students learn how to operate, manage, and maintain industry standard fine art archival inkjet printers as well as a fifteen station traditional black and white darkroom. This project provides essential expertise and knowledge that students, as lab monitors, both share with other students and incorporate into their own fine art practice and professional activities. Student researchers learn how to mix, store, and dispose of photographic chemistry, provide daily assistance to undergraduate and graduate photography students, and generate ideas for improvements to the lab. Students also contribute to the ongoing revision of the Photography Lab Manual, which specifies best practices and operating procedures for future photography lab monitors. The practical knowledge gained from this experience is highly valuable to colleges, universities, community colleges, artist co-ops, and professional photography labs that seek to employ individuals to manage and teach both digital and analog photography practices. This research was funded with an Undergraduate Research Fellowship.

P - 34**Art at the Haldeman Community Center After School Program**

****Sarah Lunsford, Dr. Joy Gritton, mentor, Department of Art and Design, Caudill College of Arts, Humanities and Social Sciences***

This project provided coordinated art activities for children participating in the Haldeman After School Program. Art activities included a wide range of art lessons that engaged and challenged each student's creativity. The program's central purpose was to offer a safe, child-centered, nurturing after school enrichment program for elementary students at the Haldeman Community Center. Participating children enjoyed visual arts instruction in 2-D and 3-D formats. For many of the students these lessons were not only an introduction to different art forms but also an outlet mentally and emotionally for stressors in their daily lives. It is hoped that the Haldeman children will have gained a greater appreciation of the role that the arts and creativity play in their present and future lives. This program was supported by a MSU Undergraduate Fellowship.

P - 35

Teaching animal sciences at the Haldeman After School Program

****Justin Shaffer, Dr. Joy Gritton, mentor, Department of Art and Design, Caudill College of Arts, Humanities and Social Sciences***

This project was to coordinate an animal science program for children in kindergarten through sixth grade at the Haldeman After School Program in Rowan County. Participants were led in lessons and activities about agriculturally relevant animals, including horses, swine, cattle, donkeys, poultry, goats, and sheep. The program culminated in a field trip to the MSU farm. This project was funded by a MSU Undergraduate Research Fellowship.

P - 36

Engaging the next generation with Appalachian studies: Building community and expanding outreach through technology and diversity of programming

****Savannah Muse, Lucy Steele, Emily Johnson, Maggie Flanagan, Dr. Joy Gritton, mentor, Department of Art and Design, Caudill College of Arts, Humanities and Social Sciences***

This research, conducted through the Appalachian Studies Association, addresses the challenges of expanding participation in the interdisciplinary ASA conference, drawing on the perspectives of student interns who worked closely with the 2018 Program Committee. Particular emphasis was placed on drawing youth into conference participation through the use of technology, including social media, and diverse programming that has relevance for younger participants and those not comfortable with traditional academic formats. This poster presentation will share "behind scene" experiences and hope to start an ongoing conversation that will help ASA leadership and others understand the benefits of meaningful involvement of students in conference planning. The project's goal is to engage ASA membership with broader regional needs and promote dialogue related to Appalachia that will foster more diverse and inclusive membership, as well as begin to include youth into the conversation. This project was supported by MSU Undergraduate Research Fellowships.

P - 37

Exploring the impact of exemplification theory on the reception of messages regarding animal biosecurity

****Madison L. Wallace, Dr. Morgan Getchell, mentor, Department of Communications, Media and Languages, Caudill College of Arts, Humanities and Social Sciences***

This study seeks to determine the impact of exemplars in news stories on people's risk decision-making process through the use of a computer simulation. Participants experience a wide variety of scenarios in which they must make risk based decisions regarding investments in hog farming biosecurity measures. The computer simulation examines the role of information, such as levels of biosecurity threats and biosecurity practices, in the participant's willingness to invest in biosecurity measures to stop the spread of porcine epidemic diarrhea virus (PEDv). This research was supported by a MSU Undergraduate Research Fellowship and supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2015-69004-23273.

P - 38**Focus particles strongly draw attachment**

****Torianne Crouch, *Joe Castle, Dr. Katy Carlson, mentor, Department of English, Caudill College of Arts, Humanities and Social Sciences***

In this project, we studied ambiguous sentences (e.g., “Sammy heard that Bill had called on Monday”). By manipulating the prosody with focus particles, emphasis, and prosodic breaks, we believed we could change how people understood the sentence. Specifically, when the focus particle “only” is placed before a verb (“Sammy only heard” or “Bill only called”), it marks the verb as important; we predicted that this would draw the attachment of the adverbial phrase “on Monday,” paralleling previous results with accented verbs. This then would change what people understand the sentence to mean (either Sammy heard something on Monday, or Bill called on Monday). Indeed, participants more often chose “heard” as the attachment site when “only” modified it rather than “called” (60% V1 attachment vs. 35%). Accenting the verbs in addition appears mostly redundant as it did not significantly affect the results. This experiment was replicated without a prosodic break before the final adverbial, and produced similar effects.

Because we study how unimpaired individuals understand spoken language in order to help language-impaired individuals in the future, this experiment was funded by the NIH (NICHD 2R15HD072713-02 and NIH 5P20GM103436-13).

P - 39**“Under Milk Wood,” an experiment in student leadership**

****Alexandra Holmes, Dr. Philip Krummrich, mentor, Department of Communications, Media and Languages, Caudill College of Arts, Humanities and Social Sciences***

In today’s world of rising expectations for students, competitive programs, and emphasis on scientific studies, it is easy to forget about the arts, or regard them as inferior to or less worthwhile than pursuits in other fields. For this presentation, I have decided to cast, direct, and act in “Under Milk Wood,” a play for voices by Welsh poet Dylan Thomas. With this research, I plan to demonstrate how the arts may still be of value to a student striving towards a fulfilling career. In many scientific career paths, students predominantly attend lectures and absorb information, and rarely have the opportunity to generate their own, unique material. To take nearly the full responsibility of a creative project on one’s own shoulders for the first time—to organize and create an event with free reign and no previous infrastructure to rely on—is a valuable opportunity for any student to participate in. With this project, I worked solely with my peers and with upperclassmen, acting as their superior in the role of the director, and also as their equal in the role of an actor. This presented several challenges, including the issues of mutual respect, organization, and compromise when working with a group of people. Overcoming these challenges and presenting a polished piece of performance art to the public was the primary goal of this research.

P - 40**Paying the price: Different models for internationalizing honors**

****Karly Potts, Dr. Philip Krummrich, mentor, Department of Communications, Media and Languages, Caudill College of Arts, Humanities and Social Sciences***

I begin with the assumption that providing different options for international experiences strengthens Honors programs, and several components of such internationalization will be compared throughout this research. Recognizing that international experiences represent heavy investments of time, energy and money for individual students and for Honors programs, I focus on a small number of programs that have made substantial commitments to international experiences for their students. I will explore various approaches to internationalizing Honors with the goal of presenting findings that may be useful to those involved in designing and implementing international components of Honors programs.

P - 41

Images of feminist protest: The negative effects of the media on the women's liberation movement

****Elizabeth Von Mann, Dr. Kris DuRocher, mentor, Department of English, Caudill College of Arts, Humanities and Social Sciences***

The protests and activism for Women's Liberation of the 1960s and 70s became defining images for the modern feminist movement. An important factor in analyzing these events is examining the differences between what the protests were trying to demonstrate and how the media at the time chose to represent the movements. The media's representation of the 60s and 70s feminist movement was a key factor in how the country came to view feminism, and the effects of this propaganda can be seen in the post-feminism of the Women's Liberation movement. This research seeks to analyze the negative effects media representation has on skewing the ideals and facts of modern feminism.

P - 42

No place like home: How Japanese internment revoked the identity of Japanese-American/Japanese-Canadian descendants

****Nathaniel Baker, *Rebecca Brindle, *Dani Wilson, *Gabby Townsend, Dr. John Ernst, mentor, History 375: 20th Century Asian Wars, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

When describing the cause of American involvement in the Second World War, scholars point to the 1941 Pearl Harbor bombing. One consequence of the bombing was Executive Order 9066, enacted by President Franklin D. Roosevelt. Executive Order 9066, better known as the creation of Japanese-American internment camps, targeted any American citizen of Japanese descent and interned them until the war had ended. While these camps were created under the guise of protecting American secrets from potential Japanese spies, the forced imprisonment nonchalantly revoked the American identity held by many loyal Japanese-American citizens. Canada followed suit, imprisoning their citizens of Japanese descent into similar camps. Not only did the internment of Japanese descendants revoke their previously held identities, the governments of the United States and Canada had blurred the line between the Japanese-American/Japanese-Canadian and the Japanese themselves. When the internment camps ended after the war, however, the native Japanese had a surprising lack of reaction pertaining to the internment camps and those who were interned. This research aims to understand both the interned Japanese's perspective post-World War II and the lack of native Japanese acknowledgment of the events.

P - 43

The not-so noble lie: The militarization of the Japanese population through education

****Kyle Cochran, *Emily Johnson, *Megan Rohmann, *Jennifer Likens, *Sydney Hackworth, Dr. John Ernst, mentor, HST 375: 20th Century Asian Wars, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

In July 1853, Commodore Matthew Perry led the American fleet into the waters of Edo Bay, forcing an end to the traditional Japanese policy of isolationism. The humiliated Japanese developed a hatred for Western imperial powers and a desire for their power. During World War II, the Japanese became infamous for war crimes and their willingness to fight to the last man. Historians generally identify economic pressures, an independent military, fervent nationalism, and military adventurism as the triggers for Japanese war time conduct. While these factors certainly played a role, we argue the Japanese education system was the true catalyst for the militarization of the population. The glorification of war was a recurrent theme in Japanese textbooks; primary school students were taught that death in combat was honorable. Music education was rife with songs about soldiers, combat, and defeating the enemy. Japanese students were told that Japanese colonialism was paternalistic, and it was the duty of the Japanese to “care” for other racially inferior Asian peoples. Photographs also suggest that young children were trained to use weapons such as bayonets.

P - 44

Comfort women: The forgotten victims of World War II

****Tessa Collins, Anthony Albrecht, Hunter Boyd, Jake Jones, Kourtney Salyer, Dr. John Ernst, mentor, History 375: 20th Century Asian Wars, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

During World War II, the Japanese Imperial Army began practicing large-scale organized prostitution. The women recruited to become prostitutes for the Army were named “comfort women.” An estimated 80,000 to 200,000 Korean women were used as sex slaves during World War II. This number does not include the Chinese or Filipino women who were forced to become sex slaves. The practice of recruiting women had far-reaching cultural effects on the countries involved. The Japanese military enslaved thousands of women, but never formally apologized for forcing women to become sex slaves. Japan, unlike Germany, has resisted providing compensation for the wartime atrocities their soldiers committed. This issue was largely ignored immediately after the end of World War II, however, as time passed, survivors and their families came forth seeking retribution for the crimes Japan committed. It is almost as if this topic had been erased and ignored internationally. Now women are fighting for justice and retribution in hopes that Japan will formally acknowledge their terrible actions against women during World War II.

P - 45

Japanese intentions behind the Pearl Harbor bombing

****Hannah Hart, *William Pruitt, *Alex Vermillion, *Colby Belcher, *Chris Linneman, *Shelbey Chappell, Dr. John Ernst, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

Due to Japanese atrocities and expansion in Asia, the tension between Japan and the United States heightened to the point that American policymakers implemented the Embargo Act, banning all trade between the two countries. This was not looked upon favorably by Japan; therefore, leaders created a plan that deployed kamikaze pilots to the American naval base located at Pearl Harbor. By examining the ideology of Japanese war tactics, this presentation will provide insight into previous Japanese and American relations, the development of the plan to bomb the United States, and the initial objective for this strategy. Furthermore, this presentation will shed light on the bombing that provided America a path into World War II.

P - 46

Animals as persons: To what extent are nonhuman animals also "persons"?

****Ravyn Lacey, Dr. Jack Weir, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

Morally and legally, human beings are "persons," but nonhuman animals are not. Why? To what extent is this critical distinction morally justified? It is acknowledged that humans and animals share the same roots, but where does the divide arise between human and nonhuman beings? What distinction proves sufficient to sever humanity from the rest? Despite many traits that are described as elevating humans above animals, these could be argued to be present at some level in various nonhuman animals. Thus, what makes us people in a way that animals are not if these traits are shared? This paper will delve into what we perceive to be a distinction between the human animal and the nonhuman, and will thus explore whether this distinction is necessary or morally justified.

P - 47

The implications and causes of the Cambodian genocide

****Jennifer Roberts, *Abby Coomes, Emily Simpson, Jonathan Dean, Makinsey Perkins, Tyler Schroeder, Dr. John Ernst, Ray Bailey, mentors, HST 375: 20th Century Asian Wars, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

In the 1970s, Pol Pot devised a ruthless Cambodian regime known as the Khmer Rouge. The Khmer Rouge adopted a strong sense of nationalism and discriminated against the Vietnamese and other racial minorities in Cambodia. This form of radical communism led to the Cambodian genocide as the Khmer Rouge "cleansed" the minorities of their culture and committed mass murder amongst their people in order to establish power. Pol Pot established the Democratic Kampuchea which forced what he called the "New People" to work on the farms and in the factories. The Khmer Rouge went as far as to convert the schools into prisons and destroyed all traces of books and equipment to rid Cambodia of their education system. This project will analyze how Pol Pot's regime created systematic racism amongst the Cambodian minorities and developed a social hierarchy.

P - 48

Taking credit: Maximizing college students' ability to raise credit scores

****Hannah Smoot, Dr. Kelly Collinsworth, mentor, Department of History, Philosophy, Politics, International and Legal Studies, Caudill College of Arts, Humanities and Social Sciences***

A common problem facing young adults today is the struggle to find financial stability due to a lack of information about beginning the process of building credit while pursuing higher education. Through a combination of research using government sources, experts in the field, and approved online sources, information about the steps one can take to build credit before obtaining a full-time position of employment will be explored. Using the information collected through the research as well as feedback from students about their current level of knowledge concerning the credit-building process, a program that serves to educate college students about the different methods of credit-building will be developed and implemented next year.

P - 49

The development of multi-tenor drums in modern pageantry arts

****Aaron Blevins, Dr. Brian Mason, mentor, Department of Music, Theatre and Dance, Caudill College of Arts, Humanities and Social Sciences***

At the beginning of the 20th century, the typical percussion section in a marching band or drum corps would include a single tenor drum. Today, the tenor voice of modern ensembles in the pageantry arts consists of four to six drums that are standard in size and arrangement. This research aims to draw a clear depiction of the evolution of the tenor drum and the role it has played in pageantry ensembles over the past century. First-hand sources, as well as photographic and video materials have been examined to generate a timeline of modifications, adaptations, and trends in design and usage of the tenor drum(s). The general trend over time was to increase the number of drums included, reduce the size, increase the similarity between different performing ensembles and manufacturers, and to increase the difficulty and significance of musical writing for the instrument. This research was funded by the George M. Luckey Honors Program.

P - 50

Tourette's syndrome: strategies for effective teaching in the music classroom

****Miranda K. Johnson, Dr. Michele Paynter Paise, mentor, Department of Music, Theatre and Dance, Caudill College of Arts, Humanities and Social Sciences***

The purpose of this study was to examine the lives of two college students with Tourette's syndrome who were majoring in music. Over a period of three months, I collected data through emails, formal and informal interviews, and observations. I then examined the data and searched for connections between music instruction and behaviors associated with Tourette's syndrome. I found that these two students encountered challenges during music instruction that might have been alleviated had their music instructors been informed of appropriate modifications of instruction for students with Tourette's syndrome. This research was funded with an Undergraduate Research Fellowship.

P - 51

The psychology of singing: The effects of emotions on the voice

****Kaitlyn S. Osborn, Dr. Roma Prindle, mentor, Department of Music, Theatre and Dance, Caudill College of Arts, Humanities and Social Sciences***

Research suggests that attachment, shame, trauma, and other emotional patterns need to be addressed in the aspiring vocalist because these factors can manifest in their voice.

Stress and performance anxiety in the singer often cause muscle tension around the larynx. Many vocalists experience difficulties in controlling their stage fright and other negative emotions. Therefore, this study aims to benefit the vocal department at MSU by increasing awareness of the effects emotions can have on the voice. My study involved self-reports from MSU vocal students pertaining to how they handle positive and negative emotions before and during a performance. I also conducted behavioral observations of these students during performance, focusing on any mannerisms they exhibited in association with their reported emotion(s) at the time. This research is supported by MSU Undergraduate Research Fellowship.

P - 52

Movement in the elementary general music classroom: Developmentally appropriate practice

****Austin J. Wood, Dr. Michele Paynter Paise, mentor, Department of Music, Theatre and Dance, Caudill College of Arts, Humanities and Social Sciences***

Elementary music teachers use a variety of movement activities in the classroom. The common thought is that movement engages a student's brain more than the contemporary lecture. In this study I explored the assistance of kinesthetics by teaching a lesson with and without movement. The group not moving will be the control group. I assessed each class with a microphone at the end of the lesson having them sing the tune by themselves. Lastly I took my recordings to an unbiased graduate student in my department and had them judge the accuracy of the recordings with a copy of the music.

P - 53

The vulnerability of homeless males to sex trafficking

****Mason Stamm, *Chelsea Dyer, *McKinley Flint, Patrick Carlisle, Dr. Elizabeth Perkins, mentor, Department of Sociology, Social Work, and Criminology, Caudill College of Arts, Humanities and Social Sciences***

Interviews were conducted with forty-one homeless males in Louisville, Kentucky, in an attempt to gain a greater understanding of the prevalence of sex trafficking among this population. This project is significant because there is a scarcity of information available concerning males as the focused group in the sex trafficking literature; as females have traditionally been the targeted population group for data collection. Homeless males between the ages of 17-22 were the targeted population for this study. Participants were located via homeless outreach workers in Louisville, shelters, and high traffic areas and regions of homeless transient individuals. With this population, homeless young males, we aim in identifying the intersections and characteristics which may contribute to exposure to the sex trafficking industry. This project is supported by MSU Undergraduate Research Fellowship.

P - 54

The map results of an integrated UAV-based remote sensing platform in the Northern Yucatán

****Sean Daugherty, *Alex Vermillion, Dr. Timothy Hare, mentor,***
Department of Sociology, Social Work and Criminology, Caudill College of Arts, Humanities and Social Sciences

The utilization of unmanned aerial vehicles (UAV's) for the purpose of archaeological mapping and modeling at the city of Mayapán, Mexico was tested. The initial test flight is in an area adjacent to the south side of Mayapán's monumental center. Previous research indicates the existence of a dense and complex system of residential and public architecture covered by low dense surface vegetation and a high forest canopy. Additional zones were randomly selected based on the density and types of surface vegetation. The resulting data of the test flights was processed in a variety of geographical information systems, photogrammetric software, and 3D modeling applications to generate final maps and models of the study areas. These results support the use of unmanned aerial vehicles for mapping purposes.

P - 55

An integrated heavy-lift unmanned aerial vehicle (UAV) and remote sensing platform

****Garrett Jones, Dr. Timothy Hare, mentor,*** Department of Sociology,
Social Work and Criminology, Caudill College of Arts, Humanities and Social Sciences

We describe an integrated heavy-lift unmanned aerial vehicle (UAV) and remote sensing platform used to map archaeological features under the forest canopy in the northern Yucatán. We collaborated with Mobile Recon Systems Inc. to construct a UAV-based aerial mapping system that can be used to create high-resolution maps and 3D models of archaeological ruins, excavations, caves, and cenotes for small to medium-sized areas of the forested environment. The system integrates Light Detection and Ranging (LiDAR) and multispectral sensors with RGB light cameras into a large UAV for simultaneous recording of visible light, near-infrared, and topographical data. The major components include the UAV, sensors, inertial measurement unit, dual channel GNSS receiver and base station, radio transmitters, control points, and mission control equipment and software. Our goal is to create a practical and cost-effective system to facilitate rapid and accurate mapping of archaeological remains and associated environmental features. This Research is supported in part by: Curtiss T. Brennan & Mary G. Brennan Foundation, Department of Sociology, Social Work & Criminology, The Craft Academy, The National Science Foundation, Morehead State University, Research & Creative Productions Committee, and The Institute for Regional Analysis & Public Policy .

P - 56

Digital history and reconstruction of the political geography of the Yucatan Peninsula

****Brooklyn Sauer, Dr. Timothy Hare, mentor,*** Department of Sociology,
Social Work and Criminology, Caudill College of Arts, Humanities and Social Sciences

We compiled and digitized historical maps of the Yucatan Peninsula and compared them with previous political geographic models of reconstructed prehispanic political connections among settlements across the region. The Late Postclassic period in Mesoamerica (A.D. 1200–1519) manifested an independent development of a market economy. This transformation of economic processes appears to have impacted the interactions among towns and cities across the peninsula and changed political organization at multiple scales. To understand these changes, we acquired the oldest available maps, overlaid them with modern maps, digitized the recorded towns, cities, and roads and compared the results with the existing political geographical models. The results tie the historical regional organization of ancient Mayan society to the cartographically accurate natural and constructed features, so we can improve on the results of previous investigations. We thank the Craft Academy for supporting our journey and Marilyn Masson from the State University of New York at Albany for sending us our first map.

P - 57**Effect of gestation length on litter size and piglet birth weight**

****Audrey L. Emery, *Dillon Q. Siefert, Courtney K. Moore, Drs. Flint Harrelson and Patricia Harrelson, mentors, Department of Agricultural Sciences, College of Science***

In swine, longer gestation length is positively correlated with piglet survivability, however, stillborn piglets are more frequent. Heavier birth weights also normally accompany longer gestation lengths. The objective of the study was to evaluate if gestation length would have a negative impact on number of piglets born alive and stillborn. At farrowing, measures were recorded via visual observation and through use of a hand-held scale. Twenty-seven sows and gilts ranging in parity from 0 to 9 were used (average parity; treated: 2.4; control: 1.5). Gestation length did not impact litter weight ($P = 0.68$) or number of pigs born alive ($P = 0.16$) or stillborn ($P = 0.16$). Gestation length however, did alter piglet birth weights ($P < 0.0001$). Changes to piglet birth weight reflect longer gestation lengths, but could also be influenced by sex. Birth weights tended to be different between males and females (3.4 vs. 3.0 pounds; $P = 0.11$). Piglet sex did not impact gestation length ($P = 0.36$). Parity however, did impact gestation length ($P < 0.0001$). Gestation length in swine varies based on a number of factors including parity and individual piglet weights. This project was supported by the MSU Undergraduate Research Fellowship program.

P - 58**Effect of calcium supplementation on gestation length, number born live, and number of stillborns**

****Courtney K. Moore, Audrey L. Emery, Dillon Q. Siefert, Drs. Flint Harrelson and Patricia Harrelson, mentors, Department of Agricultural Sciences, College of Science***

Calcium, when supplemented prior to farrowing, has been shown to reduce stillborn deaths by shortening farrowing duration. Our objective was to examine the effect of calcium supplementation on gestation length, pigs born alive/dead, and litter weight. We hypothesized that increased calcium levels in the female's diet, would reduce gestation length by inducing farrowing sooner, and therefore decrease the number of stillbirths per litter. Females receiving calcium supplementation farrowed earlier compared to controls (114.9 vs. 116.0 days; $P < 0.001$). No treatment effect on birth weight was observed (3.13 vs. 3.05 pounds; $P = 0.41$). This was also seen with total litter weight, as treatment and controls were similar (33.8 vs. 30.9 pounds; $P = 0.74$). The number of total pigs born alive was similar between groups (treated: 10.5; control: 11.22 pigs; $P = 0.57$). The number of stillborns per litter was not significantly different, however a numeric difference was observed in treated females compared to controls (0.9 vs. 1.7 pigs; $P = 0.58$). Overall, females receiving the calcium supplement farrowed earlier, however number of piglets born alive/dead and weights were similar when compared to control females. This project was supported by Hubbard Feeds and MSU Undergraduate Research Fellowship program.

P - 59

UV SOS survival and mutagenesis assay

****Aaron Adams, *Tate Avera, Drs. Deborah Cook and Janelle Hare, mentors, Department of Biology and Chemistry, College of Science***

Specific strains of *Acinetobacter baumannii* are opportunistic pathogens found to cause infections in hospitals. They can acquire resistance to antibiotics as a result of DNA damage from disinfection techniques like UV exposure. If UV exposure can be optimized by adjusting exposure time and distance from the UV lamp we can develop a standardized UV light treatment, which will give consistent 0.1-1% survival rate with comparative mutagenesis for the parent strain *A. baumannii* 17978. We used an 8-W UV lamp emitting 254 nm light; we agitated a 6 well dish-containing 1mL of a diluted culture under the lamp. Experiments were repeated for 55 seconds at 30 cm with survival rate of 0.3-1.56%. Similar experiments at 19 seconds at 15 cm yielded survival rates from 0.32-6.2%. Pre-warming the lamp reduced variability in survival. Consequently, future steps will include increasing the distance from the lamp, and pre-warming the lamp for this 30 cm distance. Research supported by NIH 2R15GM085722-03A1

P - 60

Developing an improved and reliable UV survival and mutagenesis assay

****Tate Avera, *Aaron Adams, Drs. Deborah Cook and Janelle Hare, mentors, Department of Biology and Chemistry, College of Science***

Specific strains of *Acinetobacter baumannii* are opportunistic pathogens found to cause infections in hospitals. They can acquire resistance to antibiotics as a result of DNA damage from disinfection techniques like UV exposure. If UV exposure can be optimized by adjusting exposure time and distance from the UV lamp we can develop a standardized UV light treatment, which will give consistent 0.1-1% survival rate with appropriate mutagenesis for the parent strain *A. baumannii* 17978. We used an 8-W UV lamp emitting 254 nm light; we agitated a 6 well dish-containing 1mL of a diluted culture under the lamp. Experiments were repeated for 55 seconds at 30 cm with survival rate of 0.3-1.56%. Similar experiments at 19 seconds at 15 cm yielded survival rates from 0.32-6.2%. Pre-warming the lamp reduced variability in survival. Consequently, future steps will include increasing the distance from the lamp, and pre-warming the lamp for this 30 cm distance. Research supported by NIH 2R15GM085722-03A1

P - 61

Beetles - nature's biodiversity litmus paper: A survey of the biodiversity of Coleoptera within the Daniel Boone National Forest, part 1: A synopsis of collecting and preservation techniques for beetles

****Kathryn Branham, Drs. Sean O'Keefe and Charles Lydeard, mentors, Department of Biology and Chemistry, College of Science***

Among the many groups of organisms found in Kentucky, none are quite as diverse as the beetles (order Coleoptera). Beetles can be found in virtually every ecological niche within a region. Beetles include predators, herbivores, coprophages, fungivores, necrophages, detritivores, and even cannibals. Beetles are a great indicator of biodiversity because they are numerous in both number of species as well as number of individuals, easy to collect, and are not currently at risk for extinction. To explore the biodiversity of the region surrounding the Daniel Boone National Forest, several trapping methods were utilized, including pan traps, Lindgren funnel traps, black lighting, and Berlese funnels. Each method captured different types of beetle. For example, Lindgren funnel traps captured beetles that flew approximately five feet off the ground at a tree line. Pan traps captured ground dwelling beetles, black lighting attracted nocturnal beetles, and Berlese funnels focused on beetles found in leaf litter. From these trapping methods, beetles were captured, pinned, pointed, and finally categorized by family to discern differences in niches among the various organisms. This study will serve as a precursor to a larger study on biodiversity of beetles to be completed next year.

P - 62

Pan traps: A novel method to assess spider biodiversity

****Stephen Burke, Dr. Sean O'Keefe, mentor, Department of Biology and Chemistry, College of Science***

Spiders are important small predators that inhabit a wide variety of terrestrial ecosystems around the world. A large quantity and variety of prey is required to support a healthy spider population in any particular area. Because of this, spiders can be used as a proxy to assess the overall biodiversity and health of an ecosystem. This poster is a continuation of data collection from a previous project on the quality of trapping mechanisms used to collect cursorial ground spiders. It outlines data collected from three different sampling sites. The generally accepted method, as determined by an extensive literature review, is the use of pitfall traps. Little to no use of yellow pan traps, which are commonly used to capture other invertebrates, was shown for spiders. While preliminary data shows that yellow pan traps seem to have captured more spiders overall, the pitfall traps collected a greater diversity of spiders.

P - 63

Polymerase chain reaction detection of bacterial DNA markers in the Triplet Creek Watershed

****Hannah Conley, *Amina Anwar, Dr. Geoffrey Gearner, mentor, Department of Biology and Chemistry, College of Science***

The objective of this study is to develop the use of bacterial genetic targets as markers of fecal contamination in the Triplet Creek Watershed. The Triplet Creek Watershed has been the focus of assessment and research by Morehead State scientists for well over ten years. Twelve sites were chosen because they exhibit chronically high *Escherichia coli* counts (>240 *E. coli* CFU/100 mL), or acceptable *E. coli* counts (<240 *E. coli* CFU/100 mL). Bacteria isolated from the samplings sites using the membrane filtration method were enriched in culture medium. DNA was subsequently isolated from the bacterial cultures and analyzed by polymerase chain reaction utilizing primers for 16s rRNA (bacterial marker), *esp* (human enterococcus marker), *uidA* (*Escherichia coli* marker), and a variety of antibiotic resistance genes. PCR products were assessed by agarose gel electrophoresis. All 12 sampling sites were positive for bacterial DNA, 11 of 12 sites were positive for *E. coli* DNA, and 4 of 12 sites were positive for the enterococcus marker. Several different antibiotic resistance genes were also detected in some of the sampling sites. The results demonstrate the ability to detect bacterial molecular markers in environmental water samples, allowing us to develop this further for *E. coli* source tracking in the Triplet Creek Watershed. This project was supported in part by MSU's Undergraduate Research Fellowship Program.

P - 64

Redesign of a cell culture system to investigate the effects of microgravity on cytoskeletal remodeling in smooth muscle

****Callie M. Arnold, *Kaylee M. Whitenack, Danielle N. Gibson, Dr. Michael Fultz, mentor, Department of Biology and Chemistry, College of Science***

There are few studies that have examined the effect of microgravity on the cytoskeleton in smooth muscle. Although they conclude that the phenotype of smooth muscle may be gravity dependent, those that have been performed have utilized simulated microgravity. Therefore, the effect of microgravity on the cytoskeletal elements essential for force generation and maintenance in smooth muscle remains poorly understood. The effect of microgravity on the alpha-actin, beta-actin, and myosin components of the cytoskeleton in resting and contracting A7r5 smooth muscle cells is the primary research focus. Collaboration between the Department of Biology and Chemistry, SpaceTango (Lexington, KY), and the Craft Academy for Excellence in Science and Mathematics, has resulted in a redesign of a cell culture system is that will allow for the culture, visualization, stimulation, and subsequent fixation of A7r5 cells aboard the International Space Station (ISS). Previous designs were limited by power availability prior to installation within TangoLab on the ISS. Upon return to Earth, components of the cytoskeleton will be examined by fluorescent microscopy to investigate if microgravity alters the characteristic remodeling observed on Earth.

P - 65

Examination of radiation levels in Rowan County using dosimeters

****Robert Grigsby, Mitchell Grothaus, Drs. Charles Mason and Timothy Hare, mentors, Department of Biology and Chemistry, College of Science***

The aim of the study is to find possible connections between radiation levels originating from black shale formations and the high cancer rates observed in Eastern Kentucky. The study is conducted using fifteen small devices for measuring radiation dosage (dosimeter) placed in different locations throughout Rowan county. The dosimeters are collected and replaced monthly. Each dosimeter is labeled with a number, one-fifteen, to ensure the proper data for each formation is collected each month. The devices are placed in various locations throughout Rowan County. Preliminary findings show that the dosimeters placed in the lower Huron member of the black shale formations along with the upper Cleveland member have the highest monthly radiation average, followed by sunburry shale. All of the shales are found to have higher averages than the controls, following the pattern of higher cancer rates, according to <https://www.cancer-rates.info/ky/>, occurring in areas containing higher shale deposits. Special thanks to all who have aided in the study, including an MSU internal grant.

P - 66

Do radioactive black shales affect water quality in eastern Kentucky streams?

****Mitchell Grothaus, *Elizabeth Hereford, *Robert Grigsby, Drs. Charles Mason, Geoffrey Gearner and Timothy Hare, mentors, Department of Biology and Chemistry, College of Science***

This component of the project explores the impact of radioactive and heavy metal-containing black shales on the water quality of eastern Kentucky streams. Data collection includes radiation, microbiological, and aquatic environmental testing. Radiation testing entails placing devices for measuring ionizing radiation (dosimeters) in different locations throughout Rowan, Bath, Montgomery, Fleming, and Lewis County. Dosimeters are placed in various levels of geological formations including Huron, Sunbury, and Cleveland black shales and controls in sandstone, limestone, siltstone, and Bedford shale. Microbiological testing entails sampling water five times over a thirty-day period during the recreational season at stream sites related to black shale. Samples are analyzed for concentrations of *Escherichia coli*, heterotrophic bacteria, and total coliform bacteria utilizing the membrane filtration method and various culture media. Initial sampling began at three Rowan County sites, but will be expanded to sites in Bath, Montgomery, Fleming, and Lewis Counties. Aquatic environmental testing samples are collected at the same sites for measuring dissolved oxygen, pH, total dissolved solids, conductivity, temperature, and discharge. Previous research indicates that environmental factors contribute to cancer risk and this research aims to define the nature of the interaction to improve health outcomes in eastern Kentucky. This project was supported by a Undergraduate Engagement Fellowship.

P - 67

Characterization and genome annotation of the novel mycobacteriophage phranny

****Clare Johnson, *Makayla Bush, Anna Knox, Dr. David Peyton, mentor
Department of Biology and Chemistry, College of Science***

The research I, along with a few others, have been doing is on bacteriophage discovery and identification. The first semester revolved around isolating a phage from a soil sample. The second semester, which my poster is focused on, was computer-based work in which we took already isolated phages with sequenced genomes and predicted the function of each gene in the sequence. This was done using the PECANN (Phage Evidence Collection and Annotation Network) software. My poster explains how we used different databases such as NCBI BLAST and Phagesdb BLAST to narrow down the possible function of the gene. This research is important because the more research done on bacteriophages, the more we can begin to understand about the relationships between viruses and the effect on their hosts. This program is supported by the MSU Department of Biology and Chemistry and a grant from the National Institute of General Medical Sciences of the National Institutes of Health (Grant# P20GM103436).

P - 68

Developing an understanding of moth (order Lepidoptera) diversity through collecting and identification

***Madelynn Kiefer, Dr. Sean O'Keefe, mentor, Department of Biology and Chemistry, College of Science**

Butterflies (order Lepidoptera) have long been admired for their natural beauty. However, moths, close relatives to butterflies, have often been neglected due to their mostly nocturnal nature, as well as many are fairly small, most are drab in color, and moths of many groups are difficult to identify. Moths require delicate and careful preparation and very careful handling because they are so fragile and the scales on the wings, critical for their identification, are so easily lost. Moths can provide valuable information regarding the biodiversity of an area. The diversity of moths can indicate the diversity of plants within a region since all moths are herbivorous, many having a preference to a specific host plant. An inventory of moths will likely give an indication of the diversity of plants based on the abundance or even absence of certain species of moths. This study was conducted as an introduction to the process of collecting and identifying moths, especially those included in the families Noctuidae and Geometridae. This study is the foundation for a future investigation regarding the diversity of moths within Rowan County.

P - 69

Investigating caffeine levels in water sources in Morehead, Kentucky

***Sarah R. Little, Dr. Brandon VanNess, mentor, Department of Biology and Chemistry, College of Science**

One of the major environmental challenges which necessitates attentive monitoring focuses on contaminants in different water sources around the world. Some examples of compounds that are polluting waters include pharmaceuticals, oil, byproducts from factories, and specifically, caffeine. The concentration of this work is to determine if there is a presence of caffeine in water sources in Morehead, Kentucky by primarily using solid phase extraction techniques.

P - 70

Genes affecting cell length and DNA damage-induced cell filamentation of *Acinetobacter baylyi*

***Emma Rose, Dr. Janelle Hare, mentor, Department of Biology and Chemistry, College of Science**

There are numerous ways in which a bacteria cell responds to stress-induced DNA damage. In some bacterial cells, stress-induced conditions including DNA damage or starvation cause the cell to express a filamentous phenotype. Bacteria cells who demonstrate this trait have a longer cell length than typical cells of the same strain. It is believed that the genes within these cells cause the filamentation and we have chosen to focus on *Acinetobacter baylyi* because it has multiple genes involved in the SOS response. One gene that is unique to *Acinetobacter* species is *ddrR*. Its precise function is unknown but previous data suggests that *ddrR* regulates DNA damage responses when *Acinetobacter* are cultured in minimal media. Therefore, we tested whether it also affects the phenotype of filamentation and cell length. The recent data analyzed has shown an increase of filamentation in various wild type and mutant strains of *Acinetobacter* when damaged, reinforcing previous results. It was also observed that though a *ddrR* mutant shows filamentation, the normal cell lengths of this mutant were shorter in control conditions than either the wild-type *A. baylyi* or a mutant in another DNA damage response gene, *umuDAb*. Research supported by NIH 2R15GM085722-03A1.

P - 71

Transformation of wildtype *Acinetobacter* strains with restriction digest plasmid DNA

***Kalee Rusnak, *Cecelia Howard, Dr. Janelle Hare, mentor, Department of Biology and Chemistry, College of Science**

Acinetobacter strains are opportunistic pathogens that can acquire antibiotic resistance. Constructing mutants in the lab provides information about a gene's activity in wildtype cells. Transforming wildtype strains of *Acinetobacter baumannii* and *Acinetobacter baylyi* with a streptomycin-spectinomycin (SS) resistant cassette will replace existing *umuDab* and *ddrR* and confer SS resistance to the strain. Wildtype *A. baumannii* ATCC 17978 and *A. baylyi* *ACIAD2729* strains were transformed with previously constructed plasmid DNA with a double deletion of *umuDab* and *ddrR*. To facilitate recombination of this SS mutation into the chromosome of bacteria, cells were transformed with plasmid DNA cut with *EcoR1*. Transformation was unsuccessful in *ACIAD2729*; the mutant cells did not grow on SS containing plates. 17978 grew on SS plates, suggesting that the cassette, and thus the mutation, was successfully transferred to wildtype cells. PCR was conducted with primers amplifying the SS cassette in the genome or a different primer set, and no significant difference between wildtype and mutant bands was detected. Future experiments involve finding primers to amplify the SS cassette to test whether 17978 was mutated correctly and determining the genes present in wildtype and mutant cells of *ACIAD2729*. Research support by NIH 2R15GM085722-03A1.

P - 72

Arthroshield 880: A potential new way to reduce bed bug infestations

***Kristian Sills, Anne Park, Dr. Sean O'Keefe, mentor, Department of Biology and Chemistry, College of Science**

Bed bugs have long been a scourge of Western Society, and their incidence has dramatically increased within the past few decades. They can not only invade homes and apartments, but are becoming increasingly found in motels, dorms, and other places of lodging. Currently, the only way to treat a bed bug infestation is through the extensive use of chemical pesticides. Arthroshield is developing a new method to treat textiles (e.g. mattress bindings, mattress skid fabric, carpet bindings, mattress tape, etc) that, hopefully, will decrease the survivorship of bed bugs. We have been conducting preliminary trials since mid-December. Based on our preliminary trials, Arthroshield has been modifying their application procedure and we have been modifying the experimental set up in which to test new textiles. Some of our preliminary results appear to be positive. Funding for this study was provided by Dan Short and Kyle Bullock of Arthroshield.

P - 73

Enantioselective cross aldol reactions of aldehydes

***Chase Slone, Dr. Brandon VanNess, mentor, Department of Biology and Chemistry, College of Science**

The goal of this series of experiments was to perform enantioselective catalytic cross-aldol reactions of aldehydes with proline as a catalyst. Propionaldehyde was used as the aldol donor and kept consistent throughout every trial. The electrophilic aldol acceptor aldehyde was changed between experiments to see how differences in R-group structures affected the reaction. Each experimental trial started with non-equivalent amounts of the aldol donor and acceptor. On later trials, the reaction was tested to see if closer equivalent molarities between the aldol donor and acceptor would produce a more pure product. This is relevant because it shows whether or not the proline catalyst is effective for multiple R-groups and whether equivalent or non-equivalent molarities are best at producing the desired product. Funding for this project was supported through an internal grant award from RCPC and an Undergraduate Research Fellowship.

P-74

Potential Celecoxib analogue precursors derived via Aldol condensation

****Danny J. Stanley, Dr. Mark Blankenbuehler, mentor, Department of Biology and Chemistry, College of Science***

Various indanone compounds, 1-indanone specifically, have the potential to undergo Aldol condensations to form precursors to compounds structurally similar to the Non-Steroidal Anti-Inflammatory Drug (NSAID) CELEBREX (celecoxib). A series of potential analogous precursors in the form of alpha-beta unsaturated ketones have been developed. The conversion of these precursors into pyrazoline compounds was attempted. After oxidation of the pyrazoline compounds, they could potentially have biological activity by acting through CycloOxygenase-2 (COX-2) in the same manner to CELEBREX.

P-75

Synthesis of indenopyrazole and dihydroindenopyrazole compounds as potential pharmaceuticals

****Cody A. Sullivan, Faith Paters, Dr. Mark Blankenbuehler, mentor, Department of Biology and Chemistry, College of Science***

Many indanone compounds can form precursors to compounds similar to the Non-Steroidal Anti-Inflammatory Drug (NSAID) Celebrex (celecoxib). Particularly, 1,3-Indanedione can undergo an Aldol Condensation reaction to form a series of potential analogous precursors. The conversion of these precursors to pyrazoline compounds was attempted. After oxidation, these pyrazoline compounds may have similar biological activity to CELEBREX by acting on CycloOxygenase-2 (COX-2).

P-76

Volcanic ash in the Paleocene Hooper Formation, Wilcox Group, Texas: A preliminary report

****Kala M. Brown, *Eli C. Martin III, Drs. Jen O'Keefe and W. Marshall Chapman, mentors, Department of Earth and Space Science, College of Science***

Volcanic ash in the Hooper Formation (middle Wilcox group) of Bastrop County, Texas, has not been previously studied. The goal of this project is to characterize the ash composition using transmitted light petrography and x-ray fluorescence (XRF) geochemistry, and to determine the age of the ash using radiometric age dating. This poster presents the preliminary results of geochemistry and microscopy. The ash is a vitreous tuff, and contains abundant organic matter, suggesting it fell into a wetland or swamp. This project is partially supported by an undergraduate research fellowship held by Ms. Brown.

P - 77

Palynology of the Hooper Formation, Wilcox Group, Bastrop County, Texas: A preliminary study

****Ashton Killen¹, Nicholas Cowey², Christopher Denison³, Thomas Demchuk⁴, Dr. Jen O'Keefe¹, mentor¹, Department of Earth and Space Science, College of Science; ²McKinney Roughs Nature Park, Cedar Creek, TX 78612; ³Astra Stratigraphics, Bastrop, TX 78602; ⁴RPS Group, Inc., Houston, TX 77070***

The Hooper Formation of the Wilcox Group in Bastrop County, Texas contains a series of clastic depositional systems, including coal, and is thought to be middle Paleocene in age. The present study is the lowermost in section of a series of investigations designed to help resolve biostratigraphic problems identified in the wholesale correlation of on- with off-shore Wilcox Group sediments. The Hooper is the least-studied of all Wilcox Group units; this is the first investigation of the palynology. To date, an abundant and diverse pollen, plant spore, fungal remain, and algal assemblage has been recovered from twelve preliminary grab samples obtained in May of 2017. The majority of samples are from the coal seam, with two taken from underlying siliciclastic rocks and three from an ash bed within the coal. Here we provide an overview of the results of the preliminary study.

P - 78

Deep space network upgrade

****Jacob Lewis, Jeffrey Kruth and Dr. Benjamin Malphrus, mentors, Department of Earth and Space Science, College of Science***

For the first time in history, NASA JPL has selected an outside organization to become part of its famous chain of beyond Low Earth Orbit communications network stations, better known as the Deep Space Network (DSN). NASA JPL has partnered with Morehead State University's Space Science Center, in this historic undertaking, this will allow for the development of Deep Space Station 17 (DSS-17), which will be a fully operation node on the DSN. The DSN operates within a very precise range of frequencies for its communication networks. The team at Morehead State University's Space Science Center had to upgrade the existing infrastructure to meet NASA JPL's requirements. This is a very challenging and significant engineering effort requiring many new pieces of hardware, software, and knowledge to be integrated into the system. One key element of hardware is a new radio frequency feed that is under development for the MSU 21m Space Tracking Antenna (STA). This feed is being developed by the staff and student workers at Morehead State University's Space Science Center, under the guidance of the cognizant NASA JPL engineers in the project. This presentation provides an overview of the overall system architecture of DSS-17, implementation of the radio frequency (RF) system and the work performed to design, build and implement the upgrades.

P - 79

Rapid prototyping in the development of spacecraft hardware and structures

****Ethan Palmer, Dr. Benjamin Malphrus, mentor, Department of Earth and Space Science, College of Science***

The purpose of this report is to demonstrate the practical application of rapid prototyping for the development of nanosatellites, specifically the Lunar IceCube cubesat mission, at Morehead State University. The methods used to prototype the parts used include CNC milling operations and Fused Deposition Modeling (FDM), also known as 3D printing. The use of 3D printed prototype components and subsystems allows the development of milling operations that would otherwise be tedious and difficult to visualize. They also allow the unique opportunity to perform "dry-runs" of actual integration and assembly procedures at dramatically reduced cost from actual engineering or flight hardware. By performing these dry-runs, accurate count and location of fasteners and other structures can be developed and costly mistakes can often be prevented. Finally, by building high-fidelity models of the spacecraft, precise volume and dimensional requirements can be verified. This presentation provides an overview of the spacecraft mechanical subsystem design process that includes design, modeling, rapid prototyping, engineering model assembly and integration and subsequent re-design and iteration.

Lunar Ice Cube: Development of a numerical model for attitude control

****Alexander Roberts, Drs. Benjamin Malphrus and Kevin Brown, mentors,
Department of Earth and Space Science, College of Science***

The Lunar IceCube project is a 6U CubeSat designed to prospect the moon for any sign of water in solid, liquid, and vapor forms along with any other volatiles from a low-perigee, highly inclined lunar orbit and has been selected by NASA to fly on Exploration Mission-1. For Lunar IceCube to complete its mission it will need a complex attitude control model developed specifically for the science orbit. The 7-hour science orbit requires on board instruments to be oriented lunar nadir during periapsis, the spacecraft on board communications system to oriented towards the Earth vector for communications and ranging, the solar array oriented towards the Sun vector to charge the spacecraft and the spacecrafts minor axis must be oriented perpendicular to the plane of the ecliptic for thermal management. For this to work Lunar IceCubes attitude control must have some autonomy, so the project will need a well-defined attitude model. The purpose of this study is to create an attitude model of the scientific orbit of the Luncar IceCube project. Simulation and numerical analysis tools will be used along with mathematical conventions and notations to develop the model.

Tidal Flats and Palm Savannas in Texas: Palynology of the Paleocene-Eocene Manawianui Drive Section, Bastrop County, TX

****Maggie Stephenson¹, Dr. Jen O'Keefe, mentor¹, Dr. Thomas Demchuk²,
and Dr. Christopher Denison³, ¹Department of Earth and Space Science,
College of Science, ²RPS Group, Houston, TX, ³Astra Stratigraphics,
Bastrop, TX***

Wilcox and Claiborne Group Strata from Bastrop County, TX, have been studied for the past two years. This study concentrates on an exposure of Sabinetown formation at Manawianui Drive. New data suggests that much of this exposure is early Eocene in age. An abundant and diverse pollen and spore flora has been recovered, including many important ecological indicator fungi. These include Myxomycete spores cf. *Fusiligo*, *Balanium* sp., and *Nigrospora*, all of which are wood decomposers. *Delitschia* and *Pseudodelitchia* species, both known "dung fungi," occur in all samples and provides evidence for the presence of herbivorous mammals. Forms of *Lacrimasporites*, either *L. sp.* or *L. basidii*, and *Atrotorquata lineata* are also present in some samples. Both are only known from rushes (*Juncus* sp.) in salt marshes. While only a subset of the samples collected have been examined to date, it is clear that fossil flora changes significantly upsection. The majority of the section is comprised of tidal flats bordered by palm savannas, as shown by the abundances of *Butia* sp. pollen and understory ferns, with a transition to nearshore marine as sea-level rose following the onset of the Paleocene-Eocene Thermal Maximum (PETM). This project was supported by an Undergraduate Research Fellowship.

P - 82

The implementation of opportunistic multiple spacecraft per antenna concepts on the MSU-STA Deep Space Station 17

***+Murphy C. Stratton, Dr. Charles Conner and Jeffrey Kruth, mentors,
Department of Earth and Space Science, College of Science**

A new technique called Opportunistic Multiple Spacecraft Per Antenna (OMSPA) is being developed by scientists at the Deep Space Network (DSN), and at the Jet Propulsion Laboratory (JPL). This technique is key to allow communication with many spacecrafts from a single antenna simultaneously. Currently, this is not possible with the existing JPL-DSN infrastructure. In a historic alliance, Morehead State has been invited to be part of the DSN as the first ever external organization outside of NASA to do so. As part of this, the MSU 21 Meter Space Tracking Antenna will be used as a communications asset and to allow experimentation with new techniques like OMSPA. These techniques are possible when two or more spacecrafts are along the line of sight of the antenna and within its main beam. Frequencies over a broad band are collected, digitized, and later individual spacecraft carriers are decomposed later using digital signal processing techniques. Currently, using the DSN antenna assets for experimentation is difficult, as all existing assets are fully scheduled. The Space Science Center is preparing to contribute to the DSN by providing an experimental platform for the development of new and exciting technologies. This project is designed to construct the experimental platforms in hardware and software, as well as to document the effort so that this experiment can continue across the next several years.

P - 83

The dependable multiprocessor and the DM-7 ISS flight experiment

***+Aaron Zucherman, Christopher Coleman, Kenneth Carroll, Michael Snyder, Christian Ortiz Huertas, Dr. Benjamin Malphrus, mentor,
Department of Earth and Space Science, College of Science**

The objective of the DM7 flight experiment was to demonstrate the Dependable Multiprocessor (DM) technology in the space environment. The DM7 took advantage of the availability of small, low-power, COTS Gumstix™ Computer-on-Modules allowing significant reductions in size, weight, and power consumption while increasing processing performance and reliability. By flying in the space environment on the International Space Station Nanoracks External Platform, the DM7 achieved TRL-7 validation of DM technology. The DM has the potential to be a pervasive game changing technology, applicable to any application where radiation and/or fault tolerant high-performance computing is required. A DM system is a scalable cluster of high performance COTS processors with a high-speed interconnect operating under the control of a reliable, system controller with application and hardware independent fault tolerant middleware. The system is an architecture and software framework that enables the latest COTS processing systems to operate in inhospitable environments by providing software-based SEE-tolerance enhancement. A DM system can execute multiple missions sequentially or concurrently based on resource availability and offers easy-to-use, user-configurable fault tolerant options. The Space Science Center hopes to use this technology in future missions and projects .

P - 84

EMG analysis of exaggerated hip rotation on anaerobic power during sprint cycling

****Kayly Coleman, Clay Dixon, Drs. Gina Blunt Gonzalez and Manuel Probst, mentors, Department of Kinesiology, Health and Imaging Sciences, College of Science***

The purpose of the pilot test was to determine if the addition of hip rotation can affect lower body anaerobic power during sprint cycling and to test methods for a larger study. Ten untrained subjects performed a Wingate Anaerobic Test for 30 seconds using standard cycling technique (ST) on one day and on another day, subjects switched to hip rotation (RT) for the final 15 seconds. Subjects were fitted with electrodes which were used to analyze electromyography (EMG) data. Mean anaerobic power, fatigue index, peak power and minimum power were analyzed with an Biopac Systems MP36. Analysis included a repeated measures ANOVA between ST and RT at 25 and 30 seconds, alpha was set at .05 a priori. EMG data was analyzed between ST and RT at the four locations of electrode placements. The data EMG data appear to show differences in EMG activity that could be related to differences in anaerobic power between the groups.

P - 85

MSU and Citizen Cate: A high definition look at the sun's inner corona during the 2017 solar eclipse over Hopkinsville, Kentucky

****Jessy Anderson, *Ethan Caudill, Dr. Jennifer Birriel, mentor, Department of Mathematics and Physics, College of Science***

Total solar eclipses provide data that are not accessible even to space-based coronagraphs. Viewed at any single location total solar eclipses are brief events, lasting less than 7 minutes in most cases. On August 21, 2017, a team of physics professors and students from MSU collected data as a part of the Continental-America Telescopic Eclipse (i.e. Citizen CATE) project. We were assigned a site located in Hopkinsville, Kentucky. We obtained just over 2 minutes of high resolution data. We looked to see if there was any change in the inner corona in our two minutes of data. Although we detected no changes. We report our measurements of the physical size of the sun, the inner and outer corona, solar flares and other interesting phenomenon. This work was supported by an MSU Undergraduate Research Fellowship.

P - 86

Examining a rifle's recoil with Vernier Wireless Dynamics Sensor System

****Seth Baker, Dr. Ignacio Birriel, mentor, Department of Mathematics and Physics, College of Science***

As a member of the Morehead State University rifle team for the last four years, many hours have been spent at the Button Rifle Range. In this project, we are investigating the physics of the rifle. Using the Vernier wireless dynamics sensor system (WDSS), we were able to examine the rifle's recoil by integrating our knowledge in riflery and physics. In addition to the WDSS, we also conducted the experiments using a chronograph that measured the muzzle velocity of the bullet as it was coming straight out of the barrel. In this presentation, we were able to look at the conservation of momentum of the system and apply Newton's Second Law. Using the WDSS and the values provided by the manufacturer, we can compare the actual values of the velocity and acceleration of the rifle to the theoretical values of velocity and acceleration and compare the result.

P - 87

The flying discs

****Michael Carwell, Dr. Ignacio Birriel, mentor, Department of Mathematics and Physics, College of Science***

Flying discs - more widely known as Fribees - are fairly common toys. Since their release in 1957 they have grown in popularity due to their phenomenal aero dynamical properties. On a calm summer day at the park one may expect to find game of Ultimate Frisbee or even see a match of disc golf. This experiment focuses on the latter. In disc golf there are three different types of discs: a putter, a midrange disc, and a driver. As in a regular game of golf, the different discs provide the ability to throw different distances. One may even notice how the disc will hook to the left or right depending on the handedness of the thrower. The goal of this experiment is to investigate why these discs behave in this manner. Some defining characteristics of the discs flight are the rim depth, moment of inertia, and the angular momentum. Using these concepts and other aero dynamical properties a theoretical model written in C++ will be used to compare to the experimental data.

P - 88

Forcing number, maximum nullity, and minimum rank theorems concerning the generalized Petersen graph and related observations

****Hobert J. Holbrook, Dr. R. Duane Skaggs, mentor, Department of Mathematics and Physics, College of Science***

A graph is a collection of nodes (called vertices) and edges between those vertices. The forcing number of a graph is the minimum number of colored vertices such that the graph is "forced" according to this rule: If only one neighboring vertex of a colored vertex is uncolored, then the colored vertex forces (colors) the uncolored vertex. The graph is forced when all vertices are colored. The forcing number is a graph parameter relevant to many fields since the forcing phenomenon is analogous to many phenomena in fields such as engineering and epidemiology. Current research explores the forcing number in the case of any graph. Few researchers explore the forcing number of specific graphs. We began our research by exploring already researched cases of the forcing number of a graph. After this thorough analysis, we chose the generalized Petersen graph and researched its forcing number in the general case and in specific cases. We present results concerning this pursuit.

P - 89

A study of equine gaits using video analysis and accelerometers

****Taylor B. Hudson, Dr. Jennifer Birriel, mentor, Department of Mathematics and Physics, College of Science***

Horses have several different gaits: walk, trot, canter, and gallop. The term gait refers to the horse's sequence of foot falls while it moves. For example the walk is said to be a four-beat, lateral movement while the trot is a two-beat diagonal movement. A horseback rider is familiar with the fact that each gate has a different speed and a different feel in terms of the "suspension" of the horse. We obtained video of a horse and rider performing a variety of gates in order to study the physics of a horse's motion and equate the equestrian lingo with physics terms of displacement, velocity, and acceleration. Video analysis was performed using the free physics software TRACKER. Our results demonstrate that video analysis of equine footfalls is fraught with difficulties. We discuss our preliminary results using two different types of accelerometers attached to the front and back hooves of a horse.

P - 90

The rotary engine: Design and function

****David Jacob Roger Danielson, Dr. Tim O'Brien, mentor, Department of Mathematics and Physics, College of Science***

The internal combustion engine has captivated generations of people, driving them to create new, innovative variations. One of the most successful variations on the reciprocating piston engine is the rotary combustion engine. Invented and developed by Dr. Felix Wankel, the rotary engine was a major competitor of the piston engine and continues to provide a reliable alternative to it. The design of the rotary engine and its geometry have baffled many piston engine mechanics for years. Discover the mathematical and geometric properties that make such an engine possible.

P - 91

Enhancing the understanding of calculus for everyone

****Rachel A. Layne, Dr. Kathryn Lewis, mentor, Department of Mathematics and Physics, College of Science***

Over 50% of students that enroll in an entry-level college math class end up with a C or lower in the class or end up dropping the class all together because of the difficulty. I began to think, there must be a reason why. After talking with multiple teaching instructors at Morehead I found out why. The way the material is taught to the students in most classes is out of date and does not reach most learning styles. There are four main learning styles and everyone fits in one or more of these fields of learning. When looking at derivatives and other topics in Calculus if a teacher breaks up a lesson into how the material relates, real world examples, hands on examples and then abstract examples, a teacher can reach more students in the same amount of time. Along with Dr. Lewis, we have investigated and researched the best way to teach and how to make sure that each student is getting the information they desire and need to pass Calculus or any other math class that may come their way.

P - 92

Utilizing generating functions to predict probabilities for settlers of Catan

****David A. McElroy, Dr. Rus May, mentor, Department of Mathematics and Physics, College of Science***

The key components of the game Settlers of Catan were reviewed to provide some insight on potential mathematical implications that may be used to an individual player's advantage based on the user's behavior or position on the game board. After studying the structure of the board game Settlers of Catan, our analysis indicates that one should be able to quickly determine the probability of reaching a given location in a predetermined number of steps utilizing the coefficients within a series.

P - 93

Mathematical surfaces and 3D printing

****Haily Slone, Dr. R. Duane Skaggs, mentor, Department of Mathematics and Physics, College of Science***

In studying multivariable calculus, one of the most difficult aspects is visualizing 3D surfaces that one works with. With the accessibility of a 3D printer, these theoretical models can be converted into physical models, creating both a visual and physical understanding that the conventional approaches lack. We present some of these models and describe some of the benefits of such models.

P - 94**Prevention of decubitus ulcers in the clinical setting**

****Jordan Adkins, *Carli Burton, *Samantha Cunningham, *Stephanie Parker, *Kasea Thornberry, Shelley Sadler, mentor, Department of Nursing, College of Science***

Throughout the United States each year there are approximately more than 2.5 million people that develop decubitus ulcers, costing patients and hospitals around \$9.1 to \$11.6 billion per year. Decubitus ulcers have been a progressing dilemma within the healthcare system due to failure of medical professionals to comply with workplace policies. This research aims to identify risk factors and compare current guidelines as well as establish the importance of decubitus ulcer prevention on an inpatient medical-surgical unit. The overall goal is to emphasize the importance of decubitus ulcer prevention to improve patient outcomes and decrease costs for both the patient and the facility. We intend to provide more education for those involved in hands-on patient care as well as the patients themselves.

P - 95**The best therapist has fur and four legs**

****Jordyn Boesch, *Sarah Boggs, *Mark Campbell, *Sarah Elam, *Chelsea Hunley, Shelley Sadler, mentor, Department of Nursing, College of Science***

84,914,000 households in the United States own at least one pet animal. Little do they know that these pets may be benefiting their health. Animal-assisted therapy has evolved and been shown to improve mood, as well as decrease stress, isolation, pain, and anxiety. Dogs are the most commonly used therapy pets, however many animals such as farm animals, other domestic animals, dolphins, and robotic pets have been used and studied in some circumstances. The geriatric population is a vulnerable population to pain, depression, and, isolation. 75-85% of elderly patients in long-term care facilities experience chronic pain, 2 million elderly patients in the United States have some form of depression, and 30% of all elderly people live alone in the United States. This project will investigate the use of pet therapy at a local long-term care facility, as well as potential policies related to the therapy.

P - 96**Resolving under-managed pain in infant population**

****Kansas Greenwell, *Taylor Jones, *Caitlin King, *Heather Quesinberry, *Abigail Wright, Shelley Sadler, mentor, Department of Nursing, College of Science***

Earlier philosophies for addressing pain in infants insisted that an immature central nervous system made it so the infant incurred limited response to painful stimuli. Studies from the last 30 years have given reason to shift that perspective. Not only do studies indicate that infants feel pain the same as adults, there is evidence that infants can also experience consequences from untreated, poorly treated, or delayed treatment of pain later in life. The purpose of our project is to give foresight into proper assessment and treatment of the infant before, during, and after painful medical procedures. A comparison will be made regarding recommendations for infant pain management and current policies in place at a community hospital.

P - 97

Should the family be allowed the choice to be present during resuscitation efforts?

**Brandi Hatfield, *Abigail Meade, *Rachel Mullins, *Adora Frost, *Hannah Phillips, Shelley Sadler, mentor, Department of Nursing, College of Science*

Often times, during resuscitation efforts family members are ushered out of the room. This practice may lead to doubt and the absence of closure when a loved one passes. Our research focuses on studies that have been conducted on the effects of family presence during resuscitation efforts. Our project aim is to illustrate the benefits of allowing the family to be present during resuscitation efforts along with recommending implementations a public academic health center can be to improve their protocol.

P - 98

Reducing the number of catheter insertions and/or catheter-associated urinary tract infections (CAUTIs) in the emergency department (ED)

**Allison Meade, *Ally Spencer, *Leah Hamilton, *Jordan Moore, *Emily Wheeler, Shelley Sadler, mentor, Department of Nursing, College of Science*

During our clinical rotations as student nurses, each of us have seen numerous catheter-associated urinary tract infections (CAUTI) after patients were catheterized in the emergency department. It has been noted that many patients receiving care in a variety of different units are being catheterized for reasons not indicated by the Centers for Disease Control and Prevention (CDC). Every facility has a CAUTI prevention plan in place, however the indications for catheter insertion are not always followed. Recommendations will be made for use in a public academic health care center's ED in accordance with the CDC guidelines for insertion, with the goal of reducing the number of CAUTIs.

P - 99

Bedside shift report: Improving patient outcomes

**Victoria Townsend, *Teesha Straman, *Taylor Napier, *Lakeyn Greene, *Stephanie Barker, Shelley Sadler, mentor, Department of Nursing, College of Science*

Communication has been identified as the root cause of many errors that occur in health care today. An emphasis has recently been placed on making the patient the center of health care and including the patient as a member of the health care team. This project will compare shift-to-shift report on a medical-surgical unit with the recommendations by The Joint Commission for bedside shift report. Many studies have revealed that patient outcomes are positively impacted by doing shift-change report at the bedside in full view of the patient. It is our mission to inform nurses of these outcomes by developing a protocol that standardizes the implementation of bedside shift reporting.

Mentally healthy and happy: Exercise your mind!

****Tanner L. Young, *Tyler M. Stephens, *Chloe J. Riggs, *Ashley Rowe, *Sarah Webb, Shelley Sadler, mentor, Department of Nursing, College of Science***

The purpose of this study is to investigate the mental health benefits of exercise on adult clients diagnosed with depression, as opposed to your standard pharmacological interventions. Depression is the most common psychiatric disorder and is thought to affect 121 million adults worldwide, and as such was rated as the fourth leading cause of disease burden in 2000 – projected to become the highest cause of disease burden by 2020. Antidepressant drugs are an effective and commonly used treatment for depression although almost half of those treated do not achieve full remission of their symptoms, and there remains a risk of residual symptoms, relapse, and recurrence. As such, there has been an increasing interest in the role of alternative interventions for depression. Physical exercise has been proposed as a first-line treatment, which may help to improve residual symptoms of depression and prevent relapse. This will then be compared to current treatments provided in a regional inpatient psychiatric clinical setting, with recommendations for improvement.

Traumatic events and adolescent self-reported relationship quality

****+Ashley Ball, *+Brittney Monn, *+Abigail McDevitt, Kory Phelps, Mary Blanton, Dr. Shari Kidwell, mentor, Department of Psychology, College of Science***

Familial relationships are an undeniably important factor in children's development. Attachment theory posits that such relationships serve as the foundation for relationship formation throughout the individual's life. Of particular concern, however, is when family relationships are permeated by trauma. For example, in one study women who were victimized in their adult relationships were significantly more likely to have had traumatic experiences as children (Alexander, 2009). A primary mechanism for such continuity is via perceptions, or 'internal working models' of relationships, which impact interpersonal emotions and behavior (Cassidy & Shaver, 2008). The present study examines the association between childhood trauma and perceptions of current relationships. Participants were 21 teens from Eastern Kentucky who were administered the Transition to Adulthood Attachment Interview (TAAI: Crittenden, 2005) and the 40-item ECR-RS questionnaire (Fraley et al., 2011). The TAAI was coded for the presence/absence of a variety of familial adverse events. ECR anxiety and avoidance scores were tallied for four relationships. The authors hypothesize that increased exposure to traumatic experiences will be associated with greater attachment insecurity, including higher avoidance and anxiety in adolescent relationships. This work was funded by grants from MSU's RCPC and Graduate Assistantships.

Correlation among potential measures of drug vulnerability in rats

****+Aubrey L. Bennett, Alexandria B. Cantrell, Katie L. Everman, Gregory K. Carter, Dr. Wesley White, mentor, Department of Psychology, College of Science***

A drug vulnerability phenotype is a measure that predicts whether an animal might rapidly acquire and escalate drug use. This study examined whether several potential measures of drug vulnerability were correlated. Measures included reactivity to a novel setting, intensity of "hangover" from a moderately high dose of amphetamine, and the amount of sensitization to a moderate dose of amphetamine. Adult male Wistar rats were given a moderately-high dose of amphetamine at six-day intervals, for a total of six tests. Following amphetamine administration, animals were placed in individual open fields, and activity was monitored for the next 24 hours. Before or after these tests, animals were assessed for exploration of a novel setting or for sensitization following repeated amphetamine. Scores on these measures of potential drug vulnerability were not correlated. The measures may have unique predictive value for drug vulnerability. Combining some of these measures may produce better predictors of drug vulnerability than any single measure.

P - 103**An investigation of the origins of attention deficit disorders**

***Jorden Crowe, Emily Lush, Vanessa Jones, Dr. Gregory Corso, mentor, Department of Psychology, College of Science**

Binary classification tasks present participants with a set of items (the positive set,) and asks them to memorize the set. Participants are then presented with a probe item and they have to decide whether the probe was in the positive set and respond accordingly. Prior research has demonstrated that intercept changes of the regression line relating positive set size to correct response latencies are related to probe encoding changes, while slope changes of the regression line are related to central processing changes of the probe. If deficits in attention are related to encoding issues, then a significant correlation between measures on a test of attention and the intercept of binary classification task regression lines should occur. If deficits in attention occur in central processing, then there should be a significant correlation between measures on a traditional test of attention and the slope of binary classification task regression lines. These hypotheses were tested using the Test of Variables of Attention (TOVA) and a binary classification task (the Sternberg Task). For each participant (N=41), a regression line, was calculated, and the slopes and intercepts were correlated to their corresponding TOVA score. This research was funded with an Undergraduate Research Fellowship.

P - 104**What does your Tinder profile say about you? Relationships between Tinder profile characteristics and personality traits**

***+Hunter Gatewood, Dr. Lynn Haller, mentor, Department of Psychology, College of Science**

The use of Social Networking Sites (SNS) has become an increasingly common way for individuals to find potential dating partners (Finkel et al, 2012). A common application used for finding potential partners is Tinder, a phone application that lets you browse through people within a 100-mile radius and "like" prospective partners. Research has shown that 'use of picture filters' and 'number of individuals' in a photo correlate with an individual's level of extroversion (Kramer and Winder, 2008; Gosling et al., 2011). Characteristics of Tinder profile pictures and biographies are assessed and then correlated with participant's personality scores on the Big Five Inventory (BFI; John, Naumann, & Soto, 2008). Preliminary analysis shows that characteristics such as "picture taken by someone else" and "use of two or more emoticons or 'emojis'" correlate positively with extroversion. Continuing data collection and analysis will be run assessing participants' "swiping" tendencies on researcher-generated Tinder profiles (one extroverted and one introverted profile for each gender). The Tinder Motives Scale (TMS) is also administered to assess whether an individual's reason for using the app relates to how they create their profile (Timmermans and De Caluwe, 2017).

P - 105**Evaluation of value consistent behavior in response to life events**

***+Isabella R. Gearhart, Dr. J.T. Blackledge, mentor, Department of Psychology, College of Science**

This study assessed individuals who have had traumatic versus non-traumatic life experiences to detect potential differences in how each group prioritizes and qualifies interpersonal values (including familial, romantic, and friendship-related values). Participants completed a battery of self-report questionnaires that measured psychological flexibility (the ability to flexibly and effectively persist engaging in values-consistent behaviors even when distressing experiences are encountered), personal values, traumatic life events, and degree of personal distress.

Parenting behavior and child emotion regulation during a delay task

****Hannah Gillepsie, Karina Cole, Rachel Mayhaus, Kristy Nine, Rebecca Ashley, Dr. Shari Kidwell, mentor, Department of Psychology, College of Science***

Emotion skills are central to children's development, and are believed to depend largely on their relationships with caregivers. The aim of the current study was to investigate the association of parenting sensitivity and child emotion regulation in a task designed to illicit negative affect. Thirty-five families participated when children were six years of age. They completed a task in which children had to wait 7 minutes for their prize, while their caregivers completed questionnaires. No further directions were given about how to manage the delay. Parental sensitivity and non-hostility were rated using the Emotional Availability Scales, 3rd edition (Biringen, Robinson, & Emde, 2000). Ratings of child affect and regulation were completed by separate coders, using guidelines by Silk (2006). Presence of joy, anger, or sadness was coded at 15 second intervals, as was the use of various self-regulation strategies. Although final analyses are underway, it was notable how disconnected most parents seemed from their children's likely experience. Some children remained well-regulated, but quite a few displayed sadness or anger while awaiting their prize. Our findings may demonstrate the real-time implications of caregiver's sensitivity to their children's emotional cues. This research was supported by MSU RCPC and KY NSF grants.

Can a dual task video game assess attention?

****Vanessa Jones, Mark Morris, Stephani Prince, Dr. Gregory Corso, mentor, Department of Psychology, College of Science***

The purpose for this study was to test the application of a Dual Task (DT) game as an alternative measure of attention (sustained/transient) relative to the Continuous Performance Task (CPT). The CPT is one measure of attention used to diagnose attention deficit disorder (ADD). Two videogames were created and combined into a dual task. Participants (N= 26) played the single tasks, the dual task, and completed two ADD assessment instruments. The ADD instruments were the Test of Variables of Attention (TOVA) and the CPT. The percent correct from the CPT and percent hits from the single and dual tasks were analyzed. Previous research has reported that repetition of a dual task can improve performance by cognitively integrating or by automating the single tasks within the dual task. If the tasks within the dual task are being integrated, the correlation between the percent of correct responses obtained from the CPT and the percent of hits obtained from one task contained within the dual task should be stronger for the first session, relative to the second session. No significant correlations between the CPT and the measures from the dual task were observed. This research was funded with an Undergraduate Research Fellowship.

Comparing scores: Test of variables of attention and continuous performance

****Emily Lush, Jorden Crowe, Vanessa Jones, Dr. Gregory Corso, mentor, Department of Psychology, College of Science***

We investigated the relationship between the Continuous Performance Task (CPT) and the Test of Variables of Attention (TOVA). Both of these instruments purport to measure attention deficit and serve as diagnostic instruments. We hypothesized that scores on the two tests should be correlated strongly. Participants (N=41) on two separate days, completed either the TOVA or the CPT and a binary classification task. On the second day, participants completed the remaining diagnostic instrument and a second session of the binary classification task. The data from the binary classification task are not reported here. The relationship between the TOVA and the CPT was assessed by using the average CPT latencies for correct responses and compared it to the attention scores provided by the TOVA for each participant. These data were then subjected to a correlational analysis using SPSS. No significant correlation between the TOVA and the CPT ($r = -.237$, $p = .234$) scores were observed. We cannot offer a definitive explanation why it appears the two tests are not measuring the same variables though we can speculate. Additional research is necessary to identify if this is the case and if so, what are the specific aspects being assessed by one instrument and not the other. This research was funded with an Undergraduate Research Fellowship.

P - 109

Effects of socioeconomic status on child negative behavior

****Madison Turner, Camille Felts, Dr. Timothy Thornberry, mentor,
Department of Psychology, College of Science***

We have previously shown that a parent's education level is related to child behavior; however, it is not known whether family socioeconomic status (SES) will relate to child behavior. This study examines the relationship between familial SES and observed negative behaviors in children. In this study, families were grouped into three categories based on self-reported annual income: low-, middle-, and high-income. A parent-child interaction task was then performed and coded using the Dyadic Parent-Child Interaction Coding System. Negative behaviors—negative talk, yelling, whining, and negative touch—were examined during three observation tasks: child-led play, parent-led play, and clean up. All negative behaviors were summed into a composite category. Mean composite scores for each income group were then compared using ANOVA. We predicted that children from higher SES families would display significantly fewer negative behaviors compared to children from middle and higher SES groups. Further investigation is warranted to determine if SES differentially impacts specific negative behaviors in children, positive child behaviors, and parenting behaviors. In addition, future research should explore the mechanisms by which SES impacts observed behaviors. This research was funded by Undergraduate Research Fellowships and the Appalachian Health and Research Center Research Seed Grant.

P - 110

Mouse or touch screen, which one whacks a better mole?

****Mark Morris, Stephani Prince, Vanessa Jones, Dr. Gregory Corso,
mentor, Department of Psychology, College of Science***

This research investigates whether a touch screen or a mouse, would influence the participant's performance on a dual task. Participants must play two games simultaneously. One of these games is a variant of the arcade game whack-a-mole. Whenever a mole was successfully struck, a hit was recorded, but if the participant responded when no mole was present it was considered a false alarm. These measures will be compared as a function of the input device. We expected to see better performance when participants use a mouse as opposed to a touch screen. Even though one would expect to see better performance with a touch screen because of higher precision and control, we are looking for the opposite. Touch screens are often unresponsive, and malfunction, and it is for this reason we believe there will be a higher rate of false alarms with a touch screen. If our results support this finding, we should be able to compare the results from our game to a variety of different diagnostic instruments, with the goal being to implement the game as a pre-screener for different disorders. This research was funded with an Undergraduate Research Fellowship.

P - 111

Parents' depression and the affective and narrative qualities of their descriptions of their teens

****Leighann S. Neal, Rayven Howard, Joseph Reese, Ronald Lowe, Dr.
Shari Kidwell, mentor, Department of Psychology, College of Science***

Caregiver's depression has been found to have considerable negative effects on the socioemotional development of children. Lack of sensitivity in observed parent-child interactions is thought to be a primary reason for such outcomes. Only recently, however, have researchers begun to examine how depressed parents think about their children. This study explores the association between parent's depressive symptoms and their thought patterns when describing their teens. Twenty-one families participated when their children were 4 years of age and again 12 years later. Approximately half the children were female. Parental depression was assessed using the CES-Depression Scale (Radloff, 1977). The Five-Minute Speech Sample (FMSS; Magana-Amato 1993) assessed the parents' understanding of their teen. Following published guidelines (Sher-Censor et al., 2013), FMSS transcripts were coded for positive and critical remarks, as well as for overall narrative coherence. The authors hypothesize that higher parental depression scores will be positively associated with critical statements about their teen, and will be negatively associated with coherence and positive remarks. This research was supported by an MSU Graduate Assistantship and by MSU RCPC and KY NSF grants.

P-112

Interpersonal correlates of narcissism

***Kory Phelps, Vanessa Tirabassi, Dr. David Olson, mentor, Department of Psychology, College of Science**

In recent years, investigators have distinguished between two subtypes of narcissism - one reflecting grandiosity and the other representing vulnerability. These subtypes have been hypothesized to be related to different characteristics; grandiose narcissism is associated with an inflated self-image and entitlement; vulnerable narcissism is linked to low self-esteem and shame. The current study investigated various dimensions of interpersonal functioning and their relationship with grandiose and vulnerable narcissism. Sixty individuals completed measures of narcissism and relational behaviors, including attachment style, sensitivity to rejection, and relational entitlement. Discussion of findings centers upon the nature of the relational functioning of grandiose and vulnerable narcissists.

P-113

Task attentiveness and attention deficit diagnostic measures

***Stephani Prince, Mark Morris, Vanessa Jones, Dr. Gregory Corso, mentor, Department of Psychology, College of Science**

The purpose for this study is to compare scores from a newly developed dual task game with scores from traditional tests of attention deficit disorder (ADD). We are hoping to learn the strategies of game play across individuals and how these strategies correlate with traditional ADD measures. With the new software, game players are told to perform two different tasks at the same time on a touch screen computer. On the left side of the screen, game players must first navigate a worm-apple eating game. Participants are told the space for worm-apple eating is enclosed, however the worm may go off screen, called a "warp." The presence of warps may indicate inattentiveness or inability to perform the given tasks simultaneously. On the right side of the screen participants must hit a mole, a variant of the whack a mole game. We will be comparing the warps and apples eaten to participants score from scores of Test of Variables of Attention (TOVA). The warp measure is may be a measure of the participant's inability to stay on task over time. Low on the TOVA to have a higher rate of warps. This research was funded with an Undergraduate Research Fellowship.

P-114

Changes in maternal insight during an attachment-based dyadic intervention

***Madison V. Raymer, Megan L. Conn, Kaitlyn S. Osborn, Ashley N. Hamm, Dr. Shari Kidwell, mentor, Department of Psychology, College of Science**

Previous research has demonstrated connections between mother's prenatal perceptions of her baby and herself as a parent and postnatal psychosocial outcomes. Most attachment-based interventions focus on changing parental perceptions (i.e., insights), believing this is crucial for modifying parenting behaviors. Thus, measuring such perceptions, and whether they change due to intervention, is of great import (Vreeswijk, Maas, & van Bakel, 2012). In this pilot study, the Working Model of the Child Interview (WMCI: Zenah, Benoit, & Barton, 1986) was used to assess three expectant mothers' mental representations of their babies before and after participating in Attachment and Biobehavioral Catch-up (ABC: Dozier et al., 2012). ABC is a 10-week strengths-based approach that is one of the most empirically supported early interventions for at-risk families (www.cebc4cw.org). Major aims are increasing parental nurturing responses to infant distress, following the baby's lead, and decreasing frightening behavior. Our findings from the pre-assessment WMCI suggested all three mothers seemed likely to benefit from the intervention, as their ratings indicated low to moderate insight. We are currently finalizing the post-intervention ratings, but we hypothesize each parent will demonstrate positive change. This research was supported by MSU Undergraduate Research Fellowships and Graduate Assistantships, and an MSU AHRC grant.

P-115

2017-2018 Regional Brain Awareness Program

****Joseph Reese, Terra Riggs, Brooke Cantrell, Samuel Case, Elizabeth Collins, Shannon Mapes, Taylor Cash, William Little, Georgia Clark, Gregory Carter, Dr. Ilsun White, mentor, Department of Psychology, College of Science***

The Regional Brain Awareness Program is a year-round initiative to provide the community with education on topics related to brain health. Our annual target goal is to reach 1500 or more students in our Eastern Kentucky region. To achieve this goal, students and faculty from the neuroscience program participate in visiting area high schools to provide lectures and discussion on brain health topics and in hosting the Brain Bee and Brain Drawing Contest for K-12 students in our region. We thank the award judges who provided their valuable time for judging thousands of brain drawing entries for more than a decade: Professors Robert Franzini, Elizabeth Mesa-Gaido, Gary Mesa-Gaido, Donna Kizzier, Philip Krummrich, Wesley White, and Mrs. Lucy Moore. Our special thanks go to Mr. Marvin Moore, the superintendent of the Rowan County Board of Education.

P-116

The role of personality and empathy in rule-breaking and risky behavior

****+Vanessa Tirabassi, Dr. David Olson, mentor, Department of Psychology, College of Science***

It is well known that individuals who possess psychopathic characteristics often engage in risky and rule-breaking behaviors. However, much less is known regarding the reasons or motivation underlying the actions of persons with high levels of psychopathy. The current study examined whether one feature of psychopathy, deficits in empathy, serve as motivational factors for rule-breaking behavior, risk-taking, and aggression. 60 participants completed questionnaires involving psychopathy, empathy, criminal and rule-breaking behavior, and motivation for delinquent actions. Discussion of results focuses upon empathy deficits and their role as reasons for rule-breaking behaviors in individuals with high levels of psychopathy.

P-117

The Facebook companies and data sharing: A violation of American's privacy

****Sarah Fink, Dr. Michael Hail, mentor, Department of Regional Analysis, College of Business and Technology***

The focus of this research is an examination of federalism and government organization for the intergovernmental issues concerning security of national interest and how social media relates to privacy and security policy. Facebook is the social media selected for examination in this initial phase of study. After analyzing Facebook's Data Policy and the policies of the companies owned and operated by Facebook, the privacy and implications for security were considered. There is a large amount of identifying and non-identifying data gathered on users. This data can be shared with other companies and creates a digital file of users intellectual and physical information. There are multiple policy implications for security from the results.

****William Razor, Dr. Michael Hail, mentor, Department of Regional Analysis, College of Business and Technology***

This research examines the Privacy rights and laws of the United States and the affects they have on businesses and citizens. Research at the University of Kentucky, in collaboration with Morehead State University, is being conducted to develop new surveillance technology. The initial results show that there are multiple considerations for citizen privacy related to this technology. There is also demand for this new technology as citizens are ever more concerned with their privacy. Further study has been done to illustrate the capabilities of this new technology and how exactly it will improve the privacy protections of American citizens. The results demonstrate significant variance in privacy protection by type of organization and technology.

2017-2018

Recipients of Undergraduate Research Fellowships

Morehead State University supports the initiative for students to engage in research, scholarship, performance activities and creative works. Listed below are the 2017-2018 awardees and their mentors.

COLLEGE OF BUSINESS AND TECHNOLOGY

Student	URF	Class	Department	Mentor (s)
Brenton Anderson*		JR	DETM	Jose Ortega-Moody
Jonathan Bowling*		JR	DETM	Sahar Ghanem
Michael Tyler Edlin		SR	DETM	Jose Ortega-Moody
Patrick Good		SR	DETM	Kouroush Jenab
Logan S. McLane		SR	DETM	Kouroush Jenab
Patrick Perkins		SR	DETM	Kouroush Jenab
Justin VanHoose*		SR	DETM	Jose Ortega Moody
Sydney Bennett		JR	SBA	Johnathan Nelson
Hunter Branham*		SR	SBA	Janet Ratliff
Thomas Curtsinger*		JR	SBA	Ali Ahmadi
Sarah Fink*		JR	SBA	Michael Hail
Amanda Hansford		FR	SBA	Heba Elgazzar
Christian Hensley*		JR	SBA	Steve Chen
Carley Peca*		JR	SBA	Johnathan Nelson
William Razor*		SR	SBA	Michael Hail
Binamrata Sharma*		JR	SBA	Heba Elgazzar

CAUDILL COLLEGE OF HUMANITIES

Student	URF	Class	Department	Mentor (s)
Garrett Baldrige*		JR	A&D	Adam Yungbluth
James Davidson*		FR	A&D	Elizabeth Mesa-Gaido
Nicole Duff*		JR	A&D	Jennifer Reis
Maggie Flanagan*		SR	A&D	Joy Gritton
Kansas Greenwell*		SR	A&D	Joy Gritton
Emily Johnson*		FR	A&D	Joy Gritton
Sarah Lunsford*		JR	A&D	Joy Gritton
Bethany Pace*		JR	A&D	Jennifer Reis
Dustyn Alexander Pruitt*		SR	A&D	Jennifer Reis
Kaitlyn Rhoden*		SR	A&D	Joy Gritton
Justin Shaffer*		SR	A&D	Joy Gritton
Madison Stachler*		FR	A&D	Joy Gritton
Lucy Steele*		SR	A&D	Joy Gritton
Hannah Day*		JR	CML	Donell Murray
Brooke Donahue*		SR	CML	Ann Andaloro
Joseph Brock Finley*		JR	CML	Donell Murray
Alexandra Holmes*		JR	CML	Philip Krummrich
Silvia Milantoni*		SR	CML	Ann Andaloro
Karly Potts*		JR	CML	Philip Krummrich
Madison Wallace*		SR	CML	Morgan Getchell
Taryn Syck		JR	ENG	Alison Hruby

Henry Adkins*	SR	HPIL	Thomas Kiffmeyer
Brandon Bryer*	JR	HPIL	William Green
Sarah Buschman*	JR	HPIL	James Masterson
Matthew Cooper*	SR	HPIL	James Masterson
Jonathan Dean*	SR	HPIL	Alana Scott
Madeline Heineman	FR	HPIL	Alana Scott
Matthew Hezseltine*	JR	HPIL	Kelly Collinsworth
Michala Jones*	JR	HPIL	Dianna Murphy
Ravyn Lacey*	JR	HPIL	Jack Weir
Thomas Little*	JR	HPIL	William Green
Alexa Potts*	JR	HPIL	Philip Krummrich
Max Prowant*	SR	HPIL	Jonathan Pidluzny
Alexandra Quillen*	SO	HPIL	Jonathan Pidluzny
Jeffrey Syck	SR	HPIL	Jonathan Pidluzny
Elizabeth VonMann*	JR	HPIL	Kristina DuRocher
Melissa Keyser	SO	KCTM	Nathan Kiser
Brandon Lindsey	SR	KCTM	Jesse Wells
Aaron Blevins*	SR	MThD	Brian Mason
Cassie Gibson*	SR	MThD	Lori Baruth
Timothy Andrew Hall	SR	MThD	Denise Watkins
Miranda Johnson*	SR	MThD	Michele Paynter-Paise
Lydia Kabzinski*	SO	MThD	Denise Watlkins
Kaitlyn Osborn*	SR	MThD	Roma Prindle
Austin Wood*	JR	MThD	Michelle Paynter-Paise
Brooke Donahue*	SR	SSWC	Ann Andaloro
Abbey Geurin*	JR	SSWC	Bernadette Barton
Albina Laskovtsov	FR	SSWC	Bernadette Barton/
			Rebecca Katz
Mason Stamm	SR	SSWC	Elizabeth Perkins

College of Education

Student URF	Class	Department	Mentor (s)
Hayley Boyd*	FR	ECESE	Kim Nettleton
Brianna Cottrell*	SR	ECESE	Kim Nettleton
Caitlyn Mullins*	SR	ECESE	Daniel Grace
Lauren Myre*	JR	ECESE	John Curry
Shelby Preston*	SR	ECESE	Sherry Stultz
Mallory Aronhalt*	SR	FGSE	Lola Aagaard
Joseph Ball	JR	MGSE	Sarah Lindsey
Stephen Burke*	SR	MGSE	David Long
Justin Elswick*	SR	MGSE	Lesia Lennex
Kelsey Purdum*	JR	MGSE	Kimberlee Sharp
Lars Vangen	SR	MGSE	Lesia Lennex/
			April Haight

College of Science

Student URF	Class	Department	Mentor (s)
Briana Bosley	FR	AGR	Patricia Harrelson
Frank Kilgallin	FR	AGR	Patricia Harrelson
Courtney Moore*	SR	AGR	Patricia Harrelson
Dillon Siefert*	JR	AGR	Patricia Harrelson
Amina Anwar*	JR	BIOL/CHEM	Geoffrey Gearer
Sydney Blanton	SO	BIOL/CHEM	Geoffrey Gearer
Kathryn Branham*	SR	BIOL/CHEM	Sean O'Keefe
Kayla Coleman*	JR	BIOL/CHEM	Manuel Probst/ Gina Gonzalez
Hannah Conley*	SR	BIOL/CHEM	Geoffrey Gearer
Jesseca Dale*	JR	BIOL/CHEM	Allen Risk
Logan Davis	JR	BIOL/CHEM	David Peyton
Katherine DeBurger*	JR	BIOL/CHEM	Allen Risk
Jessica Eskridge	SR	BIOL/CHEM	Kurt Gibbs
Danielle Nicole Gibson*	SR	BIOL/CHEM	Michael Fultz
Lyndsey Green*	SR	BIOL/CHEM	Allen Risk
Elizabeth Hereford*	JR	BIOL/CHEM	Geoffrey Gearer
Cecelia Howard*	JR	BIOL/CHEM	Janelle Hare
Anna Knox*	SR	BIOL/CHEM	Kurt Gibbs
Taelor McMillin	JR	BIOL/CHEM	David Peyton
Maggie Pollitt	SR	BIOL/CHEM	Kurt Gibbs
Miranda Robinson	JR	BIOL/CHEM	David Peyton
Kalee Rusnak*	SR	BIOL/CHEM	Janelle Hare
Chase Slone*	SR	BIOL/CHEM	Brandon VanNess
Jenna Slone*	SR	BIOL/CHEM	Allen Risk
Minh Tran*	FR	BIOL/CHEM	Ann Andalaro
Kala Brown*	JR	ESS	Jeffrey Kruth
Tobias Gedenk*	SR	ESS	Benjamin Malphrus
Chloe Hart*	JR	ESS	Benjamin Malphrus
Timothy Huffman	SO	ESS	Thomas Pannuti
Rebecca Mikula*	SO	ESS	Dirk Grupe
Mitchell Nichols*	SR	ESS	Thomas Pannuti
Sarah Norris*	SR	ESS	Thomas Pannuti
Ethan Palmer*	SR	ESS	Jeffrey Kruth
Jacob Schabert*	JR	ESS	Benjamin Malphrus
Maggie Stephenson*	FR	ESS	Jen O'Keefe
Allison Hull	SR	KHIS	Gina Gonzalez
Jessy Anderson*	JR	MAPH	Jennifer Birriel
James Blackburn*	SR	MAPH	Jennifer Birriel
Justin Brewer	FR	MAPH	Doug Chatham/Duane Skaggs/ Robin Blankenship
Ethan Caudill*	SR	MAPH	Jennifer Birriel
James Hankins*	SR	MAPH	Jennifer Birriel
Barbara Roether	FR	MAPH	Doug Chatham/ Duane Skaggs/ Robin Blankenship
Alexandria Cantrell*	SR	PSY	Ilsun White
Samuel Case*	JR	PSY	Ilsun White/Wesley White
Elizabeth Collins*	JR	PSY	Ilsun White

Jorden Crowe*	SR	PSY	Gregory Corso
Camille Felts*	SO	PSY	Tim Thornberry
Ashley Hamm*	SR	PSY	Shari Kidwell
Emily Lush*	SR	PSY	Gregory Corso
Mark Morris*	SR	PSY	Gregory Corso
Madison Raymer*	SR	PSY	Shari Kidwell
Madison Turner*	SO	PSY	Tim Thornberry
Brianna Ward	JR	PSY	Ilsum White/Wesley White
Kaitlyn Wilson	SR	PSY	Tim Thornberry

*presenting at the 2018 Celebration of Student Scholarship

Student Index

Adams, Aaron	56
Adkins, Henry Clay.	17
Adkins, Jordan	68
Ahmadi, S. Sarah	9
Albrecht, Anthony.....	50
Ammons, Kristen	27
Anderson, Brenton	9
Anderson, Jessy.....	65
Amwar, Amina.....	57
Arnold, Gentry M.....	39
Arnold, Callie.....	3, 57
Aronhalt, Mallory	13
Arthur, Cameron	3, 39
Ashley, Rebecca.....	72
Avera, Tate.....	56
Baker, Nathaniel	49
Baker, Seth.....	65
Baldrige, Garrett	14
Ball, Ashley.....	70
Barker, Stephanie.....	69
Belcher, Colby	51
Bennett, Aubrey L.....	3, 70
Bennett, Nicole	36
Blackburn, James	33
Blaine, Erin	36
Blakeman, Kennedy.....	40
Blanton, Mary	70
Blevins, Aaron	52
Boesch, Jordyn.....	68
Boggs, Sarah	68

Bowling, Jonathan.....	38
Boyd, Hayley	40
Boyd, Hunter.....	50
Branham, Hunter.....	37
Branham, Kathryn.....	56
Brindle, Rebecca	49
Broadwell, Cory R.	33
Brown, Kala M.....	61
Bryer, Brandon.....	18
Burke, Stephen.....	57
Burton, Carli	68
Buschman, Sarah M.	18
Bush, Makayla	58
Campbell, Mark	68
Cantrell, Alexandria B.	3, 70
Carlisle, Patrick.....	53
Carpenter, Kristen	13
Carroll, Kenneth.....	64
Carroll, Tanner	28
Carter, Daniel M.	11
Carter, Gregory K... ..	3, 70
Carwell, Michael.....	66
Case, Samuel.....	3, 75
Cash, Taylor.....	75
Castle, Joe	3, 48
Caudill, Ethan	65
Chappell, Shelbey	51
Childs, Lindsay	10
Clark, Georgia.....	75
Clarkson, Christina	40
Cochran, Kyle	50

Cole, Karina	71
Coleman, Christopher	64
Coleman, Kayly	65
Collins, Elizabeth	75
Collins, Tessa	50
Conley, Hannah	57
Conn, Megan L.	74
Coomes, Abby	51
Cooper, Matthew D.	18
Cottrell, Brianna	40
Cowey, Nicholas	62
Crouch, Torianne	3, 48
Crowe, Jordan	71, 72
Cunningham, Samantha	68
Curnutte, Aaron	6
Curtsinger, Thomas	37
Dale, Jesseca	24, 27
Danielson, David Jacob Roger	67
Daugherty, Sean	54
Davidson, James	14
Day, Hannah	16
Dean, Jonathan	20
DeBurger, Katherine	25
Demchuk, Thomas D.	62, 63
Denison, Christopher N.	28, 62, 63
Dixon, Clay	65
Donahue, Brooke	17
Duff, Nicole	14
Dyer, Chelsea	53
Eisenhour, Jon	25
Elam, Sarah	68

Elswick, Justin	3, 45
Emery, Audrey L.	24, 55
Everman, Katie L.	3, 70
Felts, Camille	73
Fink, Sarah	6, 75
Finley, Joseph Brock.....	16
Flanagan, Maggie.....	46, 47
Flint, McKinley.....	53
Fossett, Matthew	25
Frost, Adora	68
Fultz, Trey.....	33
Gardner, Kristina.....	28, 30
Gatewood, Hunter	71
Gearhart, Isabella R.	71
Gedenk, Toby.....	28
Geurin, Abbey.....	23
Gibson, Cassie.....	3, 22
Gibson, Danielle	26, 57
Gillespie, Hannah.....	72
Gillum, Kelli	41
Gindlesperger, Emily	34
Green, Lyndsey	25
Greene, Lakeyn	69
Greenwell, Kansas A.	15, 68
Grigsby, Robert.....	58
Grothaus, Mitchell	58
Gullett, Clayton.....	29
Hackworth, Sydney.....	50
Hall, Brooke	10, 39
Hamilton, Leah	69
Hamm, Ashley N.	74

Hankins, James Logan	23
Hart, Chloe	29
Hart, Hannah	51
Harvey, Katelyn	41
Hatfield, Brandi	69
Hauck, Sierra	29
Haught, Kennedy	30
Hayes, Andrew	7
Heeb, Nicholas	7
Hensley, Christian	37
Hereford, Elizabeth G.	58
Hess, Ashley	41
Hezseltine, Matthew	19
Holbrook, Hobert J.	66
Holmes, Alexandra	48
Honaker, Paige	41
Howard, Cecelia	60
Howard, Rayven	73
Hudson, Taylor B.	66
Huertas, Christian Ortiz	64
Hunley, Chelsea	68
Hunt, Jarred	11
Hutchinson, Krystiana	26
Johnson, Clare	58
Johnson, Emily	47, 50
Johnson, Miranda K.	52
Jones, Garrett	54
Jones, Jake	50
Jones, Michala	19
Jones, Taylor	68
Jones, Vanessa	71, 72, 73, 74

Kabzinski, Lydia	23
Kiefer, Madelynn	59
Killen, Ashton	62
King, Caitlin.....	68
Knox, Anna.....	58
Lacey, Ravyn	51
Layne, Kyle.....	34, 67
Layne, Rachel A.....	67
Lemaster, Maria	32
Lewis, Jacob.....	62
Likens, Jennifer.....	50
Linneman, Chris.....	51
Little, Sarah R.	59
Little, Thomas	7, 19
Little, William.....	75
Lowe, Ronald.....	73
Lunsford, Sarah.....	46
Lush, Emily.....	71, 72
Mahanes, Mary-Claire	42
Mapes, Shannon.....	75
Marriner, Emma C.	30
Martin III, Eli	61
May, Kenneth B.	38
Mayhaus, Rachel.....	72
Maynard, Megan	42
McDevitt, Abigail	70
McElroy, David.....	67
McLean, Emily	42
Meade, Abigail.....	69
Meade, Allison.....	69
Mijid, Molon-Ochir.....	10

Mikula, Rebecca	30
Milantoni, Silvia	17
Minser, Elisabeth	43
Mitchell, Haylee.....	35
Monn, Brittney.....	70
Moore, Courtney K.....	23, 55
Moore, Jordan	69
Morris, Mark	72, 73, 74
Mullins, Caitlyn	43
Mullins, Rachel.....	69
Muncy, Amethyst.....	20
Muse, Savannah	47
Myre, Lauren.....	45
Napier, Taylor	69
Neal, Leighann S.....	73
Nichols, Mitchell.....	31
Nine, Kristy.....	72
Norris, Sarah	31
Osborn, Kaitlyn S.....	53, 74
Pace, Bethany.....	15
Palmer, Ethan.....	62
Pang, Xiaotong.....	12
Park, Anne.....	60
Parker, Stephanie	68
Peca, Carley	38
Perkins, Makinsey.....	51
Phelps, Kory.....	70, 74
Phillips, Hannah.....	69
Potts, Alexa	17
Potts, Karly	48
Preston, Shelby	43

Prince, Stephanie.....	72, 73, 74
Prow, Aubry.....	44
Prowant, Max.....	21
Pruitt, Dustyn Alexander	15
Pruitt, William.....	51
Purdum, Kelsey.....	3, 46
Quesinberry, Heather	68
Quillen, Alexandra C.	21
Ray, Ian.....	34
Raymer, Madison V.	74
Razor, William.....	8, 76
Reese, Joseph.....	73, 75
Rhoden, Kaitlyn	16
Richardson, Nadia.....	36
Riggs, Chloe J.	70
Riggs, Terra.....	75
Roberts, Alexander	63
Roberts, Jennifer	51
Roe, Zack	34
Rohmann, Megan.....	50
Rose, Emma	59
Rowe, Ashley.....	70
Rusnak, Kalee	60
Sain, Christian.....	9
Salyer, Kourtney	50
Sauer, Brooklyn	54
Schabert, Jacob	32
Schroeder, Tyler.....	51
Shaffer, Justin	47
Sharma, Binamrata.....	11
Shu, Linya.....	39

Siefert, Dillon Q.....	24, 55
Sills, Kristian.....	60
Simpson, Emily.....	51
Simpson, Rachel	35
Slone, Chase.....	60
Slone, Haily.....	67
Slone, Jenna E.....	24, 27
Slusher, Stacie.....	13
Smith, Lindsey	45
Smoot, Hannah.....	52
Snyder, Michael	64
Spencer, Ally.....	69
Stachler, Madison	13, 16
Stamm, Mason	53
Stanley, Danny J.	61
Steele, Lucy.....	47
Stephens, Cameron	35
Stephens, Tyler M.....	69
Stephenson, Maggie.....	63
Straman, Teesha.....	69
Stratton, Murphy C.	64
Sullivan, Cody A.....	61
Syck, Tyler.....	22
Tackett, Tanner	35
Thompson, Kristy	44
Thornberry, Kasea.....	68
Tirabassi, Vanessa.....	74, 75
Townsend, Gabrielle	22, 49
Townsend, Victoria.....	69
Tran, Minh	17
Tso, Yu.....	32

Turner, Madison.....	73
VanHoose, Justin	12
Vermillion, Alex	50, 52
Victory, Rachel	44
VonMann, Elizabeth	3,48
Walden, Amanda.....	45
Wallace, Madison	47
Webb, Sarah	67
West, Melanie	27
Wheeler, Emily	66
Whitenack, Kaylee	3, 56
Wilczewski, Sarah.....	29, 32
Wilson, Dani	48
Winters, Katerina	27
Wood, Austin	3, 52
Wright, Abigail	65
Wu, Cuibing.....	12
Young, Tanner L.....	67
Zucherman, Aaron	62



MSU is an affirmative action, equal opportunity, educational institution