



**AUBURN UNIVERSITY
AT MONTGOMERY**

Research Symposium

April 23, 2021
Noon to 2 PM

Courtyard and Hallway outside Taylor 221-223

War Crimes: A Study of Bad Apples and Bad Barrels?

Kasey Badger

Political Science

Dr. Pia Knigge

In this research, I study two instances of war crimes that were committed by US Military personnel. The question I ask is, why did the My Lai Massacre and the Abu Ghraib Prison Scandal occur? I do a qualitative analysis of various testimonies and interviews with individuals who participated in these atrocities. I argue that both the situation and the dispositions of the people involved interacted to produce these outcomes.

Does Snail Preference to Nonnative Plant Species Play a Role in Shaping Plant Communities in Alabama?

Haley Hobbs

Geographic Information Systems

Dr. Claudia Stein

Understanding the mechanisms that maintain species diversity is crucial to maintaining healthy and well-functioning ecosystems. Generalist herbivores, which feed on a variety of different plant species, can reduce seedling establishment and plant performance, thereby inducing changes in plant community composition, diversity, and functioning. Our project will couple lab and field experiments to test the impact of snail herbivory on seedling establishment of different native and non-native plant species found in forest ecosystems in Alabama.

We hypothesize that snails – even though they are considered generalist herbivores - will selectively feed on plant species, and that these feeding preferences will influence the abundance of nonnative plant species we find in Alabama’s plant communities. To test our hypothesis, we will be performing a set of lab and field experiments. The first step was to determine if snails have a feeding preference by conducting a series of cafeteria-style feeding experiments in the laboratory exposing starved snails to six different herbaceous nonnative plant species collected in the field. The results indicate that snails have a strong preference towards specific species but that these preferences change with the seasonal growth cycles of the plants.

Our results are important to improve the design of our feeding experiments. In the future, we will use plant material from seedlings grown under standardized conditions. We will focus on different woody species native and non-native to AL forest ecosystems to test whether snails as generalized herbivores are influencing invasion and plant community dynamics within Alabama forests and other habitats.

Charles Brockden Brown's "The Man at Home": Crisis, Isolation, and Narrative

Mikia Holloway, Emma Butler, McKenna Odom

English

Dr. John Havard

The students worked together (with a few others who can't be present) to write an article with Dr. Havard on Charles Brockden Brown's short story "The Man at Home." The story explores experiences of isolation during the 1793 Philadelphia Yellow Fever epidemic, which the authors relate to the current COVID-19 pandemic.

Analysis of a Community Lake for Water Quality Indicator Bacteria

Shalom Kim, Jasmine Walker

Biology

Dr. Benedict Okeke

Potential presence of pathogens in community water should be regularly inspected, as pathogens can cause diseases. Presence of coliform bacteria in water indicate microbial water quality. The purpose of this study was to assess potential presence of pathogenic microbes in a community recreational lake by analysis of water quality indicator bacteria. Water samples from the east and the west of a community lake were collected. The samples from each location were taken in two weeks increments, over a span of six successive weeks, for a total of three samples per location. The samples were analyzed for the existence of coliform bacteria and *E. coli* using the IDEXX colilert most probable number method. In addition, a heterotrophic plate-count was conducted for the samples. All samples displayed significant numbers of coliform bacteria and *Escherichia coli* compared to water quality criteria for recreational water.

Disruption of C. elegans Genes Required for Fertility Using CRISPR Technology

Rosse Patel

Biology

Dr. Tim Kroft

Using CRISPR technology, we will inhibit transcription of target genes in *C. elegans*. Inhibition of these target genes is evaluated to be likely to result in sterility as they are overly expressed in sperm than egg cells. Once knock-out or inhibition of this gene is done, the *C. elegans* worms are followed to ensure proper integration into the genome. Then, the gene will be knocked-in and the gene's role in fertility will be determined by the ratio of the progeny.

This presentation will summarize the CRISPR methods, plasmid construct, and injection protocol.

*Drought Neutralizes Potential Benefits of Plant-Soil Biotic Interactions
in Prairie Restoration*

Raegan Rainey

Environmental Science

Dr. Cláudia Stein

Restoring native communities is a difficult task and despite intensive labor and economic investments, restored communities are often markedly different from comparable undisturbed, remnant communities. Native prairie ecosystems provide important ecosystem services, including water and air purification, erosion mitigation, biofuel and food production. However, less than 1% of the original range in North America remains and prairie restorations often fail. Investigating the ecological drivers of prairie plant community dynamics, and how they might change under changing climate conditions, is therefore crucial for conservation and restoration efforts.

Symbiotic associations between plants and arbuscular mycorrhizal fungi (AMF) are important to plant health, and can provide nutrients, drought tolerance, and disease resistance. However, the presence and quality of AMF communities may not only vary greatly between undisturbed prairies and the degraded cropland where restorations typically take place but also between drought and non-drought conditions. We assessed whether AMF from remnant prairies are more beneficial to plant growth compared to AMF from disturbed sites and whether drought plays a role by performing a greenhouse experiment. We grew seven plant species in three different soil inocula: old agricultural field, remnant undisturbed prairie, and sterile soil as a control. All plants were grown under well-watered and under drought conditions. We measured plant growth and AMF colonization rates in the roots. Our results show higher AMF colonization rates and higher plant biomass in remnant prairie soil inoculum compared to old agricultural soil inoculum, but only under well-watered conditions. Our findings have important implications for restoration. By inoculating old agricultural fields with remnant prairie soil ‘probiotics’, we might increase prairie restoration success rates. However, drought conditions may neutralize these beneficial interactions.

*Application of Machine Learning to the Prediction of Atmospheric Turbidity
Using RGB Images of Cloud-Free Sky*

Kylie Tran

Computer Science

Dr. Semih Dinc

As direct-beam sunlight passes through the cloud-free atmosphere, scattering of light by air molecules and aerosols attenuates its brightness. A parameter called the turbidity measures the amount of attenuation. Because air molecules are extremely small, they scatter primarily the blue component of sunlight, while scattering by aerosols is more uniform across the solar spectrum. When the concentration of aerosols in the atmosphere is small, scattered solar radiation coming from directions other than the direction of the sun appears very blue, but when aerosol concentration is high, the scattered radiation appears whiter. Wetting of aerosols when atmospheric humidity is high also increases the scattering of sunlight by aerosols and causes the sky to appear whiter.

In this project, we compare the blue and green components of light coming from cloud-free regions of the sky to see if they can be used as predictors of atmospheric turbidity. In our experiments, we first created a dataset using 57 days of sky images (taken in 2013 and 2014). Clear sky regions in the images were chosen, then the number of training samples was increased by cropping multiple images of smaller size from the original regions. Each sample was labeled with the measured turbidity for the day on which the sample image was taken. We trained a prediction model with multiple machine learning algorithms. Initial results are promising, and we are currently working on improving results by experimenting with additional machine learning algorithms.

Stock Market Value Prediction using Deep Learning

Ali Yildirim

Computer Science

Dr. Semih Dinc

Predicting stock prices has been a major challenge for many businesses, analysts, and economists to make successful business investments. Making efficient predictions depends on the manual analysis of weeks, months, or years of data and finding of important trend patterns on the stock price. In this study we want to automate this process and see whether Machine Learning (ML) algorithms could make accurate enough predictions for real world application or not.

The project aims to determine if feeding all available data on a company's stock to an Artificial Neural Network (ANN) model and making future predictions is feasible, and if so, to what extent. We've used the Recurrent Neural Networks (RNN) model and Long short-term memory (LSTM) cells for the RNN model to make these predictions. One of the biggest challenges with this idea is that the chart and the data are not the only indicators of what the price will be in the future. There are many things that can influence the price of a stock, and it is a challenging task to turn all of that into manageable forms of digital data and feed it to our algorithm. We hoped the machine learning could analyze the patterns in the stock price charts. We have attempted to use different methods to find correlation between stocks/commodities or stocks and other stocks to improve our results.

College of Nursing and Health Sciences

Quality Improvement Project

Chandra Darden

Nursing (doctoral)

Dr. Julie Freeman

Problem: Statistics show that 40.5% of African American men and 44% of African American women over 20 years of age have hypertension based on measured high blood pressure or taking antihypertensive medications (Centers for Disease Control and Prevention [CDC], 2016; National Center for Health Statistics [NCHS], 2018). Berkley-Patton et al. (2018) suggests that the faith community is beneficial in enhancing knowledge about HTN.

Participants/Data Sources: The quality improvement project consisted of African American individuals recruited via a church email directory. The participants were 18 years or older. Variables that were different were age, sex, and health/reading literacy. The data sources were collected from the participants after the submission of the pretest and posttest.

Methods: The quality improvement project consisted of 11 participants between the ages of 24-70 years of age. The participants completed an 8-week educational session of different HTN topics weekly via YouTube. The participants received a pre-test that was completed and re-submitted via email. The participants were given access to the link on YouTube to review the education on that topic. After reviewing, the participants completed and submitted a posttest. The pretests and posttests were graded, and scores were compiled and kept in a locked computer excel spreadsheet.

Results: The weekly test scores were evaluated to determine that the posttests scores increased after participants reviewed the YouTube educational sessions.

Conclusions and Implications: The results showed that the faith community can impact the African American community by providing HTN education. The project shows that if people are educated on health topics, their knowledge is increased, and lifestyle behaviors may change if knowledgeable about their health.

Quality Improvement Project

Amy Long

Nursing (doctoral)

Dr. Julie Freeman

A young child experiencing social worries, left untreated, has the potential to develop into social anxiety in adolescence. When identified in the preschool years, early intervention has the highest success probability. Many children are dismissed as expressing 'shyness' while actually struggling with social skills, behavior inhibition and social related stress. Social

anxiety and isolation can be a contributor to increased general anxiety, depression and other comorbidities. Routine screening for social worries is not currently considered standard of care in many primary care and pediatric offices. The aim of this project was to introduce the use of a screening tool in the primary care office that assists the provider in identifying children who are exhibiting behaviors of social worries. Results of the project identified 50% of the children as experiencing social worries.

Quality Improvement Project

Samantha McDowell

Nursing (doctoral)

Dr. Julie Freeman

Osteoporosis is a metabolic disorder that affects over 200 million people worldwide, and although well-known, there continue to be gaps in practice regarding screening and treatment. There is a need for early identification of those at risk for osteoporosis in order to help prevent fractures and reduce morbidity and mortality in the population of people 50 years and older. The International Osteoporosis Foundation (2021) provides a best practice model with a coordinated care approach through a Fracture Liaison Service (FLS). An orthopedic practice in the Southeast United States that specializes in bone health is not utilizing the internal FLS effectively. A quality improvement project was implemented that focused on screening and treatment for osteoporosis in individuals with first time fractures age 50 years and older. A custom alert button was introduced into the electronic health record to prompt orthopedic surgeons to refer to the FLS clinic when patients met requirements of age and a first-time fragility fracture. Chart audits were completed to analyze both pre- and post-implementation phases. Descriptive data showed 5% FLS referrals in 2019. Descriptive data revealed 5% FLS referrals in the pre-implementation phase. After implementation of a custom alert button the FLS referrals for post-implementation were 19%, providing a 14% overall improvement rate. Referring to an FLS is considered best practice for improving the care and treatment of osteoporosis and for decreasing morbidity, mortality, and health care cost.

Fall Prevention Deserves Your Attention

Allison McCrimmon, Ta'Mia Henry, Jasmine Jones,
Raven Rivers

Nursing

Dean Leuner

The Benefits of Breastfeeding on Infant and Maternal Health

Isabella Jenkins, Sydney Chandler, Brylie White

Nursing

Dean Leuner

Mentoring in Motion: Benefits of Mentorship Programs for New Graduate Nurses

Katherine Beasley, Lauren Lawrence

Nursing

Dean Leuner

Treatment and Prevention of Childhood Obesity

Brittany Stallworth, Cassidy Howard, Kierra Turner,
Krystal Courtney

Nursing

Dean Leuner

Ventilator Acquired Pneumonia in Rural Hospitals

Carli Chavez, Grace Hamrick, Kaitlyn McDonald,
Meredith Nall

Nursing

Dean Leuner

Reducing Length of Stay in the Emergency Department

Kayla Bizzle, Darian Thompson, Andrew Wilson

Nursing

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Promoting End of Life Care

Molly Compton, Addie Glover, Katherine Mann,
Autumn Ware

Nursing

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Parental Bonding within the Neonatal Intensive Care Unit

Hannah Leachman, Margaret Hutto, Sloane Patterson, Chasity Smith

Nursing

Dean Leuner

Technological Zoom to Recovery

Joe Dietz, Tiffany Overton, Josh Milliman, Sarah Eubanks

Nursing

Dean Leuner

Implantation of Bedside Shift Handoffs

Nicole Calhoun, Emily Fuller, Ashton Mann, Hannah Thompson

Nursing

Dean Leuner

The Prevention of Readmission for Patients with Heart Failure

Kahari Williams, Trinity Stallworth, NaShayla Hervey

Nursing

Dean Leuner

Infant Mortality and Preterm Birth among African American Women

Beatrice Muiruri, Debrika Miles, Jathiya Shaheed,
Tiffany Gill

Nursing

Dean Leuner

Readmission Prevention for Mental Health Patients

Jordan Mills, Matthew Woodall, Price Walker, Sunmi Kang

Nursing

Dean Leuner

Thank you for joining us today!

Our goal is to build on the past success of the College of Science's Research Symposium and Dean Leuner's vision for Research on the Green to grow this event into an annual university-wide celebration of student research and creative activity in future years.

*Organized by the Experiential Education & Engagement Center (EEEC)
and the University Honors Program (UHP).*

