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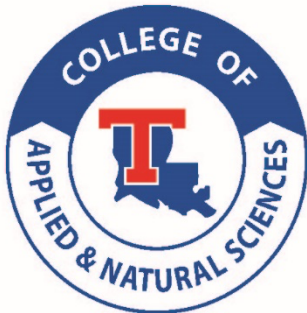
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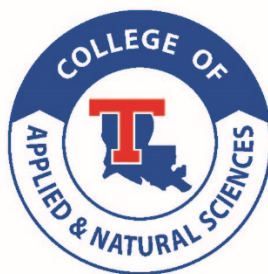
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**College of Applied and Natural Sciences
ANS Day & ANS Research Symposium
Louisiana Tech University Student Center**

April 14, 2022

8:10 – 10:30 AM Oral Presentations - Names of oral presenters are listed below. Located on the second floor rooms 222, and 224

Introduction

Dr. Jamie Newman, Associate Dean for Research

Presentations

An Evaluation of Sonderegger Pine Morphology

Kelsey Shoemaker, Dr. Paul Jackson

School of Agricultural Sciences & Forestry

*Graduate Student Presentation

The Effects of Carcass Weight, Ribeye Area, and Feeding Program on Subsequent Yield Grade of Beef Carcasses

Molly Dickens, Spencer Stelly, Dr. Mark Murphey

School of Agricultural Sciences & Forestry

*Undergraduate Presentation

The Effects of Weaning Weight on Future Growth and Carcass Traits in Swine

Brittani Mobley, Corinee McFerren, Dr. Mark Murphey

School of Agricultural Sciences & Forestry

*Undergraduate Presentation

Take Them to CORT: The Case of Circulating Glucocorticoid Levels and Heterophil to Lymphocyte Ratios in *Sula granti*

Michael Hirschak, Dr. Terri Maness

School of Biological Sciences

*Undergraduate Presentation

Synthesis and Antimicrobial Analysis of Novel Short Peptides

Katie Pierce, Dr. Rebecca Giorno-McConnell

School of Biological Sciences

*Graduate Student Presentation

Identification of Organophosphate Degrading Microorganisms in Northern Louisiana

Jacob Mitcham, Dr. Terri Maness

School of Biological Sciences
*Graduate Student Presentation

Break

Crabtivating Behavioral Analysis: The Impacts of Fipronil Pesticides on Blue Crab *Callinectes sapidus*) Behavior

Sadie Annabeth Rawls, Dr. Jennifer Hill
School of Biological Sciences
*Undergraduate Presentation

What Lies Below: Brown Food Webs Differ Below Bark Beetle Attacked and Un-attacked Wood

Nicholas Benedetto, Dr. Natalie Clay
School of Biological Sciences
*Graduate Student Presentation

Predicting the Impacts of Sublethal Pesticide Exposure on Predator-Prey Interactions: the Impacts of Fipronil on Crayfish (*Procambarus clarkii*) and Physid Snail Behavior

Megan Burns, Dr. Jennifer Hill
School of Biological Sciences
*Graduate Student Presentation

Impact of COVID-19 on HIIM Education

Joanna Ward, Dr. Perna Dua, Dr. Xijuan Liu
Department of Health Informatics & Information Managements
*Faculty Presentation

COVID-19 Community Engagement & Viral Surveillance

Dr. Jamie Newman
School of Biological Sciences
*Faculty Presentation

9:30 – 11:30 AM Poster Viewing Session – Poster presenters will be in attendance.
(*Main Floor of Student Center*)

Posters will be presented by students and faculty members from academic units within the College of Applied and Natural Sciences

11:30 – 1:00 PM Lunch Buffet - Free for ANS students, faculty, staff, and invited guests
(*Main Floor of Student Center*), tickets available in academic unit offices

12:15 - 1:00 PM ANS Student and Faculty Awards
(*Main Floor of Student Center*)

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ORAL PRESENTATION ABSTRACTS

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An Evaluation of Sonderegger Pine Morphology

Kelsey Shoemaker, Dr. Paul Jackson
School of Agricultural Sciences & Forestry
*Graduate Student Presentation

Sonderegger pine (*Pinus x sondereggeri* H.H. Chapm.) is a naturally occurring hybrid of longleaf (*P. palustris* Mill.) and loblolly pine (*P. taeda* L.) found in areas where the parent species coexist. Seedlots collected from longleaf pine cones for seedling propagation in the nursery typically contain some hybrid seeds. Sonderegger pine seedlings are detectable in the nursery with initiation of height growth and terminal bud extension above the more sessile buds of longleaf pine. The hybrid seedling is culled prior to packing and shipping because its commercial value for wood products has been questioned. It was surmised decades ago that observations of poor bole and limb formation made on some mature Sonderegger pines characterized the hybrid species. Sonderegger pine's morphological development and subsequent commercial value has rarely been investigated since it was first described one century ago. With advances in longleaf and loblolly pine genetics through seed breeding programs and innovations in wood product utilization, it is uncertain whether discriminating against Sonderegger pine remains justifiable. The objectives of this research are to document and describe morphological characteristics of five-year-old Sonderegger pines planted on the Kisatchie National Forest near Pollock, LA and compare Sonderegger pine seedling quality morphological attributes with loblolly, longleaf, and slash (*P. elliottii* Engelm.) pine seedlings, which are commonly planted in the South. The goal of this research is to gain a better understanding of Sonderegger pine seedling quality and juvenile sapling development that may lead to further investigation for its usefulness in wood product utilization.

The Effects of Carcass Weight, Ribeye Area, and Feeding Program on Subsequent Yield Grade of Beef Carcasses.

Molly Dickens, Spencer Stelly, Dr. Mark Murphy

School of Agricultural Sciences & Forestry

*Undergraduate Presentation

This project is a multi-year endeavor to determine the production trends and carcass characteristics of cattle harvested in North Central Louisiana at the Louisiana Tech Meat Science Laboratory. It is designed to analyze traits that affect the overall yield grade of beef cattle with the goal of informing producers of production improvements and return on investment increase. The study utilizes data collected from 284 head of cattle presented for harvest from January 12, 2021 to February 21, 2022. The two primary elements utilized in determining carcass value are Yield Grade (YG) and Quality Grade (QG). Factors that affect the yield grade are determined utilizing backfat measurement (BF), ribeye (longissimus dorsi muscle) area (REA), the estimated percentage of kidney-pelvic-heart fat (KPH), and hot carcass weight (CW). The data will investigate the effects of hot carcass weight, age, and feeding program on the ribeye area, ribeye area per 100 pounds of the carcass, and subsequent yield grade of the animal. Once a baseline of data has been established, future data collection will be used to determine trends and changes in cattle presented for harvest with a comparison to national trends. Of the 284 cattle harvested, we found the average ribeye area to be 9.7033 in², ranging from 2.5 in² to 15.3 in² with a national average of 1.1 in² of ribeye area per 100 pounds live weight, and the average yield grade to be 2.302, ranging from 0.007 to 5.455 with a national average of 2.5.

The Effects of Weaning Weight on Future Growth and Carcass Traits in Swine

Brittani Mobley, Corinee McFerren, Dr. Mark Murphey
School of Agricultural Sciences & Forestry
*Undergraduate Presentation

This project is to determine if weaning weights in swine is an indicator of future growth and carcass traits. All research was conducted at the Swine unit located at Louisiana Tech University. This research was funded by ANS undergraduate mini grant and Louisiana Tech Swine Unit. We investigated the weaning weight, growth rate, and finishing weight of 21 piglets that are half-siblings or greater. Data collected is weaning weight, average daily gain, and finishing weight. Data collection began 35 days after birth and until market weight is reached. Effort was taken to mimic commercial production practices with feeding, watering, and space. In our data collecting process every three weeks between each litter's weaning dates to March 12th, 2022, they were weighed on a scale and dewormed. Once they reached the finishing weight of excess 230 pounds we proceeded by sending them to the Meat Science Laboratory, where they are harvested. Carcass trait data will be collected two days post harvest. From our data collected of two littermates our weaning weight ranged from 11 to 24 pounds. Then the same pigs ranged from 75 to 143 pounds on March 12th, 2022. The average daily gain for each pig was respectively 0.47 lbs/day to 0.88 lbs/day. The weaning weight has an effect on future growth.

Take Them to CORT: The Case of Circulating Glucocorticoid Levels and Heterophil to Lymphocyte Ratios in *Sula granti*

Michael Hirchak, Dr. Terri Maness

School of Biological Sciences

*Undergraduate Presentation

Vertebrates have a variety of physiological responses when exposed to stressors. Field biologists have proposed two metrics to quantify stress of wild vertebrates: circulating glucocorticoids (stress hormone) and neutrophil (mammals)/heterophil (birds & reptiles)-to-lymphocyte ratios. In this study, we examined the heterophil-to-lymphocyte (H/L) ratio and circulating corticosterone (CORT) levels in a population of Nazca Boobies (*Sula granti*). According to previous reports, H/L ratio and CORT levels both positively correlate with increased stress; therefore, we predict that CORT levels and H/L ratios should correlate with one another in a given individual. Blood samples (1–2ml; <1% of body weight) were collected by brachial venipuncture. A drop of the collected blood was used to make blood smears while the serum was saved at -80oC until analyzed for circulating CORT using competitive ELISA kits. Blood smears were stained and total and differential leukocyte profiles were counted. The H/L provided by these counts was used for analysis. CORT and H/L ratios were natural log transformed, and there was no significant correlation between the two metrics ($r = -0.10$, $N = 68$, $P = 0.41$). Many previous studies that found significant correlations between these metrics were performed on short-lived avian species while few studies were performed on long-lived species such as the Nazca booby. The lack of relationship between CORT levels and H/L ratios in our study could be due to differential investment in self-maintenance seen in short- vs. long-lived species. More studies such as ours need to be performed in long-lived species to settle this question.

Synthesis and Antimicrobial Analysis of Novel Short Peptides

Katie Pierce, Dr. Rebecca Giorno-McConnell
School of Biological Sciences
*Graduate Student Presentation

A significant pending threat to the public health system is the rise of multidrug resistant bacteria and an attractive potential option is antimicrobial peptides (AMPs). AMPs are peptide chains with lengths that range from 5 to 70 amino acid residues that show antimicrobial activity. AMPs tend to have less toxicity than other antibiotic therapies, have a broader range of activity, and decreased resistance development by the target cells. Short AMPs are especially attractive due to their stability as well as their ability to penetrate cell membranes. With a wide range of possible AMPs available, further characterization of these molecules is needed before using AMPs in a clinical setting. For this study, I synthesized 4 previously identified AMPs (WLRRKAWLRR, WLRRKAWLRRKA, IIGGR, and HPQYNQR) using solid phase peptide synthesis. The next step was to test their ability to slow the growth of bacterial species by determining the minimum inhibitory concentration (MIC) of each peptide against a broad range of bacteria. To determine the MIC, an alamarBlue colorimetric assay was used with a 96-well polypropylene microtiter plate. Growth inhibition is indicated by the well turning blue and growth will be indicated by the well turning pink. We are currently in the process of determining the MICs and will report the latest results at ANS day. This novel study combines four AMPs and a broad range of bacteria species to allow for a comprehensive comparison of these potential novel antibiotic therapies. This comparison could renew interest in these AMPs and possible combinatorial therapies.

Identification of Organophosphate Degrading Microorganisms in Northern Louisiana

Jacob Mitcham, Dr. Terri Maness
School of Biological Sciences
*Graduate Student Presentation

Organophosphates (OPs) are one of the most commonly used pesticides around the world, accounting for more than 30% of worldwide insecticide sales. OPs also serve as the active ingredient in chemical warfare nerve agents such as sarin and Novichok. Exposure to OPs can have acute effects such as nerve damage and death or result in long-term and sublethal deleterious effects on nontarget organisms in the environment. The widespread use and consequent accumulation of these compounds in soils, drainage areas, waterways, and on our food has generated interest in finding ways to bioremediate contaminated sites. This project aims to identify soil microorganisms that have the ability to degrade OPs. We collected 22 soil samples in and around the Ruston, LA area, grew the soil microorganisms in OP selective media, and then sequenced the V3 and V4 variable region of 16S rDNA from the organisms that appeared to be positive for pesticide degradation. We found positive samples from seven different locations and isolated nine organisms with the putative ability to degrade OPs. The organisms are *Enterobacter* spp. (*cloacae* & *tabaci*), *Klebsiella* spp. (*subterraneum* & *quasipneumoniae*), *Novosphingobium subterraneum*, *Pantoea agglomerans*, *Pseudomonas* spp. (*mendocina* & *multiresinivorans*), and *Shimwellia blattae*. These organisms could play an important role in bioremediation and results can help us understand how pesticides are used and spread over environments due to the presence or absence of degrading organisms in soils.

Crabtivating Behavioral Analysis: the Impacts of Fipronil Pesticides on Blue Crab (*Callinectes sapidus*) Behavior

Sadie Annabeth Rawls, Dr. Jennifer Hill
School of Biological Sciences
*Undergraduate Presentation

Pesticides are carried into coastal habitats where they can impact organismal physiology, movement, and behavior. Ecologically and economically important crustaceans, such as blue crabs, may be influenced by pesticide exposure, ultimately affecting important behaviors such as foraging, navigation into commercial traps, and reproduction. Yet, there are few studies that examine pesticides impacting ecologically important blue crab behaviors. We examined feeding behaviors, including handling and total feeding time, and orientation behaviors including righting time before, during, and after exposure to fipronil pesticides (0, 0.5, 1, 5 ug/L). We also measured time to cease movement after pesticide exposure. Feeding assays showed that the lower fipronil concentrations and control crabs successfully consumed snails, while crabs exposed to 5ug/L individuals did not. Similarly, righting times suggest impairments to higher concentrations compared to the lower concentrations but was highly variable. Crabs exposed to 5ug/L of fipronil demonstrated erratic movements and paralysis/stiffness, which resulted in longer times to stop moving after entering the tanks and after disturbance. However, crabs exposed to lower fipronil concentrations exhibited orientation and movement patterns similar to controls. Consequently, fipronil in higher concentrations is likely to impair crab foraging and behavior which could affect blue crab populations resulting in economic losses and ecological impacts. As fipronil is rarely assessed in water quality surveys and fipronil use is increasing, we suggest regular monitoring for fipronil pesticides in estuarine environments

What Lies Below: Brown Food Webs Differ below Bark Beetle Attacked and Un-Attacked Wood

Nicholas Benedetto, Dr. Natalie Clay
School of Biological Sciences
*Graduate Student Presentation

Discerning the factors that mediate biodiversity patterns is critical to understanding ecosystem productivity, functions, and their impact on a broader ecological scale. Roughly 50% of terrestrial biodiversity resides within the brown food web, a central component in the decomposition and nutrient recycling of deadwood and litter, which makes up over 30% of global carbon stocks. Bark beetles attack and kill pine trees, inoculating them with bluestain fungi which can increase woods attraction to termites. As ecosystem engineers, termites can increase species diversity in decomposer systems. We tested the prediction that brown food webs below wood inoculated with bluestain fungi would see increased invertebrate diversity, but that those treated with bluestain fungi or H₂O would have greater diversity than plots without wood. In 2014, 10 trees were felled and cut into 0.5m bolts with half receiving bluestain fungi to simulate bark beetle attack and half just DI H₂O. Leaf litter was collected from plots after 1 and 7 years of decomposition and invertebrates extracted using Berlese funnels then quantified and identified. Contrary to the first prediction, preliminary results indicate that H₂O inoculated wood supported slightly greater abundancies and diversity of leaf litter invertebrates compared to under bluestain wood. However, in support of the second prediction, diversity was higher when wood was present than not. Bark beetles generate millions of tons of coarse woody debris annually and these results suggest they that bark beetle attacks may slow Carbon and nutrient cycling by increasing rates of deadwood stock and slowing rates of decomposition.

Predicting the Impacts of Sublethal Pesticide Exposure on Predator-Prey Interactions: the Impacts of Fipronil on Crayfish (*Procambarus clarkii*) and Physid Snail Behavior

Megan Burns, Dr. Jennifer Hill
School of Biological Sciences
*Graduate Student Presentation

Predators uphold the structure and function of communities by reducing prey abundance (consumptive effects) and altering prey behavior and distribution (non-consumptive effects). These effects can cause trophic cascades that have positive effects on foundation resources. Pesticides can alter these effects by impacting the ability of predators to capture and consume prey and/or prey to respond to predators. Predicting how pesticides will impact trophic cascades depends on whether predators, prey, or both are affected and whether the cascade is driven by consumptive or non-consumptive effects. Yet, few studies have investigated how pesticides affect these mechanisms. To understand how predator-prey interactions can be altered by a pesticide, we exposed crayfish and physid snails to fipronil and measured their foraging, mobility, and predator avoidance responses. Crayfish are predators of snails, and their predation reduces grazing on periphyton, a foundation resource, which increases periphyton abundance. To determine pesticide impacts on consumptive effects, crayfish were assessed on their consumption of snails and macrophytes. To assess crayfish mobility and predator avoidance, we measured the time crayfish took to exit an area with crushed conspecific cues. Effects on snail foraging and mobility were assessed by measuring consumption of periphyton. Impacts on predator avoidance were assessed via snail responses to crayfish chemical cues. We determined that neither predators nor prey were affected, as crayfish and snail foraging, mobility, and predator avoidance were not altered by fipronil. This suggests that fipronil may not affect the crayfish-physid snail-periphyton trophic cascade, as neither consumptive effects nor non-consumptive effects were affected.

Impact of COVID-19 on HIIM Education

Joanna Ward, Dr. Prerna Dua, Dr. Xijuan Liu
Department of Health Informatics & Information Managements
*Faculty Presentation

The COVID-19 pandemic impacted the functioning and outcomes of the education system by suddenly changing to online course delivery formats. In particular, Health Informatics and Information Management faced unique challenges such as online clinical delivery, decreases in research opportunities and magnified instructor responsibilities. Professional HIIM organizations assisted with mitigation of online resource issues, but other challenges remained. A 37-question survey designed to gauge the COVID-19 impact on teaching, course delivery mechanisms and outcomes of HIIM in higher education deployed to 323 HIIM program managers in the US. Initial analytics of 113 respondents showed that 63 participants (55.75%) believe their institutional response to COVID was very good. Of those 63 participants 43 (65.15%) did not consider changing jobs. There were 20 participants (42.55%) of the 63 responses, who considered changing jobs and believed their institutional response to COVID was very good.

COVID-19 Community Engagement & Viral Surveillance

Dr. Jamie Newman
School of Biological Sciences
*Faculty Presentation

The COVID-19 pandemic has raised a significant number of challenges and opportunities over the past two years. Among the opportunities has been the chance to evaluate the ways in which we engage in public health and how we monitor and track the spread of disease in our communities. My group of graduate and undergraduate students has been working in a few of these areas for the past 18 months, specifically using wastewater-based epidemiology and genomic sequencing to track SARS-CoV-2 infection and identify specific variants in Ruston, LA. We have been able to track SARS-CoV-2 in wastewater and seen that our techniques, to date, track with regional infection rates. This work will become increasingly important as COVID-19 becomes an endemic and there is more at-home testing and perhaps less reporting. In addition, in close collaboration with Grambling State University, we have sequenced SARS-CoV-2 positive samples from approximately 1% of the Ruston population and been able to, in real-time, track the inflection of variants from Delta to Omicron. With these techniques and collaborations in place we can continue work to track COVID-19 and expand our efforts in the future to other pathogens to support the health of our community.

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Virtually Escaping a Root Cause Analysis

Lauren Colvin, Melissa Madden, Dr. Sherry Peveto, Brittney Helton
Department of Health Informatics & Information Management, Division of Nursing
*Faculty Presentation

Research indicates communication failures in healthcare are responsible for the majority of sentinel events. Evidence of inter-collaborative communication educational strategies among nursing and health informatics (HIM) students are not found in the literature. The use of virtual escape rooms as an educational strategy have demonstrated effective results in other disciplines; however, no studies have utilized an inter-collaborative virtual escape room method to determine students' self-confidence in collaborating among HIM and nursing students. The intent of the project was to determine if an interprofessional collaborative virtual escape room design is an effective method for building self-confidence in nursing and HIM students' ability to collaborate through occurrence reporting and root cause analysis.

Do nursing and HIM students perceive a virtual inter-collaborative escape room design as an effective teaching strategy for building self-confidence in learning to collaborate through occurrence reporting and root cause analysis?

Fifteen students (N=15) from the HIM and nursing departments participated in the 30-minute virtual inter-collaborative escape room activity. Results indicated 100% agreed/strongly agreed that the activity was an effective teaching strategy, promoted learning, and they were confident they were mastering the content of the simulation.

The inter-professional virtual escape room design is an effective teaching method for building students' perceived self-confidence in learning to collaborate. This is a significant contribution, as both HIM and nursing students will engage in collaborative relations upon entering the workforce. Practicing collaboration prior to entering the workforce can lead to improved patient safety.

Let's Dance: Developing a Music & Movement Program for the Parkinson's Community

Dr. Donna Hood, Denise Pyles, Mary Kathryn Eastman, Elizabeth Stone, Hannah Ward
Division of Nursing
*Undergraduate Presentation

Exercise as medicine, for those with the diagnosis of Parkinson's disease (PD), is well documented in the literature. Developing a class for the PD community that incorporates music and movement based on the international Dance for PD® program was a priority for the Parkinson Resource Center (PRC) at Louisiana Tech after experiencing these classes in Kyoto, Japan at the World Parkinson Congress. Implementing the program at the start of a pandemic brought additional challenges. Using an evidence-based framework, collaborating with community dance professionals, and including students and faculty in the implementation team were critical to the program's success. A Community Grant from the Parkinson's Foundation and support from private donors provided the necessary support to connect Louisiana Tech students and faculty with the Parkinson's community. The opportunities to build communication and observation skills were key outcomes for participating nursing students. Combining a sense of community with the benefits of regular physical and mental exercise and engaging music were key benefits identified by PD participants. The Music & Movement program, developed through the work of the Parkinson Resource Center, is a key opportunity for impactful service for Louisiana Tech University.

Identity, Belonging, and Community in Young-Adults

Danielle Powers, Dr. Amy Yates
School of Human Ecology
*Undergraduate Presentation

The purpose of this research is to explain, through a literature review, how young-adults seek and find personal identity in society with a focus on community. Development of the young adult involves self-discovery, learning rather quickly through stress and potential crisis, and making major life choices for themselves. Exploring this topic introduces the idea of community and the ways in which these sub-groups may influence, alter ideals, challenge, fulfill, exclude, and along with countless other emotions and feelings, change life for young-adults yet again. Both the positive and negative will be illustrated as this topic is a personal battle for me that I believe could be beneficial regardless of the trial and errors one may experience.

You Can't Spell Divorce Without COVID

Leilani Celestine, Sydney Ferguson, Dr. Amy Yates
School of Human Ecology
*Undergraduate Presentation

Our purpose in this research study was to examine how the COVID-19 pandemic affected the stability of marital relationships. We used several different questions to guide us through our research and to explain this occurrence. Some of these questions included, what factors from the pandemic affected relationships, how did covid restrictions impact marriage dynamics, did financial stability and job security affect relationships, etc. It was discovered that several factors answered these questions. We found that increasing time together led to more arguments, differences of opinions on COVID restrictions created a divide, pre-existing conflicts became heightened due to stress, and many more. The end of our research led to the conclusion that the pandemic heavily impacted the stability of marital relationships in many different ways. It was also concluded that divorce rates have increased due to various factors including pre-existing conflicts, difference of opinions, and close proximity for prolonged periods of time.

The Product Analysis of Men's Henley Shirts: What Affects Serviceability?

Fisher Hull, Landry Long, Hailey Minton, Dr. Kathleen Heiden
School of Human Ecology
*Undergraduate Presentation

The purpose of this project was to determine how apparel construction affects the fit, performance, and cost of a garment of three different brands of men's Henley shirts representing different price point.

Shirts were evaluated for sizing and fit, construction, and cost. Construction of the garments were analyzed by determining seams and stitches. Cost sheets were completed for each brand including materials, duties and taxes, labor, trimmings, and packaging.

All brands had standing collars and front button plackets. Design components of the shirts were similar for most components. However, George had raglan instead of set-in sleeves and Columbia sleeves did not a cuff. These differences affect the design of the garment to meet customer serviceability for comfort. Based on the original and washed garment measurements, the garments will meet customer serviceability for fit. The total cost of merchandise for the shirts varied by about \$.80 with Columbia being the lease expensive and George the most expensive. Even though the George shirt had the highest cost it had the lowest retail price.

The Columbia and the Croft and Barrow were very similar in almost every aspect. Both shirts fit customer needs for comfort, style, and fit. When considering serviceability, Croft and Barrow had the best all-around comfort, quality, and price.

The Influence of Early Childhood Educators' Food Insecurity on Children's Health Outcomes

Dario Cosic, Bethany Joiner, Grace Kennedy, Wilson Yates, Dr. Julie Rutledge

School of Human Ecology

*Undergraduate Presentation

Obesity detrimentally affects children and demographics of all ages, and numerous studies have pointed to health risks associated with obesity. Focusing on preventing obesity in preschool-aged children has been shown to positively impact Children's Health Outcomes (CHOs) and negative habits that persist into adulthood, as these children are at a critical development period for behavior change. The We Inspire Smart Eating (WISE) program targets influential Early Childhood Educators (ECEs) to promote fruit and vegetable consumption in preschool-aged children in two Lincoln Parish schools: Head Start and Lincoln Parish Early Childhood Center. The program measures its effects on CHOs pre- and post-intervention using Body Mass Index (BMI) and Resonance Raman Spectroscopy (RRS). BMI was calculated based on the weight and height of children. RRS was used to assess fruit and vegetable consumption by measuring carotenoid levels in children's hands. Prior to WISE implementation, ECEs were assessed to determine levels of food insecurity with an Educator Feeding Survey, a validated measure of assessment. This study explores the association between ECEs' food insecurity and CHOs. We predict that high levels of food insecurity among ECEs will lead to higher BMI and lower RRS scores among the children in their classrooms. Investigating the food insecurity of ECEs could lead to improvements in childhood obesity prevention intervention programs, such as WISE.

Product Quality Analysis of Toddler Dresses: What Affects Serviceability?

Dexteny Moody, Elizabeth Register, Dr. Kathleen Heiden

School of Human Ecology

*Undergraduate Presentation

The purpose of this project was to determine how apparel design and construction affect customer serviceability through fit, performance, and cost.

Three toddler dresses from different brands and price points were evaluated for construction, sizing and fit, and cost. Cost sheets were completed by evaluating the materials, construction, and packaging. Construction characteristics were evaluated to determine stitch and seam types. All three dresses are 100% cotton knit and are therefore comfortable and easy to take on and off. The stitches and seams on all dresses are appropriate for each application to the construction of the garment. The patch pockets on the Jumping Beans dress add to the aesthetic of the garment. The Wonder Nation dress has inseam pockets, which are functional rather than aesthetic. The cost of construction for all the dresses were similar but Wonder Nation was the least expensive garment. The Old Navy and Jumping Bean dress do not meet customer serviceability for fit and the Wonder Nation dress met the qualifications for shrinkage. The Wonder Nation dress had the least amount of shrinkage, which is important for comfort, fit, and durability. It is also the least expensive option among the three dresses. Therefore, the Wonder Nation dress best meets serviceability based on design and cost.

Textile Properties of Girl's Dresses: What is the Effect on Serviceability?

Elizabeth Register, Dexteny Moody, Dr. Kathleen Heiden
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*Undergraduate Presentation

The purpose of this project was to test the textile performance of three different brands of girl's dresses representing three different price points to determine if there were differences based on the textile properties.

The general construction of each dress was evaluated including yarn structure, weave structure, method of coloration, fabric weight, and thread count. Dimensional stability, resistance to staining, colorfastness of the and wickability of each brand was evaluated. The results were rated using the AATCC Scales.

All three garments were 100% cotton jersey with simple single staple yarns. Old Navy had the greatest shrinkage after the first laundering. However, Jumping Bean and Old Navy both exceeded the industry standard allowed for shrinkage. The appearance retention of all the dresses were similar after laundering. All dresses had similar performance results for resistance to staining, but the Walmart stained the most.

The performance of the dresses revealed that the Old Navy dress had the worst performance. The Walmart and Jumping Bean dresses performed similar even though the price difference was significant. Since the Walmart dress performed similarly and was lower priced, it is the best purchase out of the three dresses in terms of quality and performance to meet customer serviceability.

Textile Properties of Men's Henley Shirts: Does Price Matter?

Hailey Minton, Fisher Hull, Landry Long, Dr. Kathleen Heiden
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*Undergraduate Presentation

The purpose of project was to test the performance of three different brands of Henley T-Shirts to determine if there is any difference based on textile properties.

The general construction of each dress was evaluated including yarn structure, weave structure, method of coloration, fabric weight, and thread count. Dimensional stability, resistance to staining, colorfastness of the and wickability of each brand was evaluated. The results were rated using the AATCC Scales.

The George was 100% polyester rather than a cotton and polyester blend. The Croft and Barrow brand performed the best in dimensional stability. Croft & Barrow and George had similar appearance retention after laundering. The Columbia and the George had a better resistance to staining than the Croft and Barrow. Overall, even though each brand had different crocking results, they all met industry standards.

The Columbia and the Croft and Barrow were very similar in almost every aspect. Although the Croft and Barrow had lower scores on a few tests, it still met industry standards. Columbia had the best scores on a few tests but had poor dimensional stability even though still acceptable. Both shirts were very similar so the question is, does the customer feel it is it worth spending an extra \$12 on the Columbia Henley?

Sustainable Fashion from Unconventional Materials

Samantha Taylor, Dr. Kathleen Heiden
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*Undergraduate Presentation

This project is inspired by the overwhelming evidence that proves the fashion industry is one of the most unsustainable industries in the world. This is largely due to the devastating impact of fast fashion. In addition to creating disposable apparel at an alarming rate, the fashion industry uses and discards of cardboard boxes, garment bags, and other textile materials daily. The purpose of this project is to reduce the waste of the fashion industry by using unconventional, recycled materials from within the fashion supply chain to create a wearable garment.

Three garments were designed and created using unconventional materials. To create the first garment, a thrifted throw blanket was used to make a two-piece ensemble. The blanket was transformed to a skirt and top. The second look was completely made from recycled garment bags acquired from a local boutique. A two-piece ensemble was created from the plastic. The third and final look was made from recycled cardboard boxes. A two-piece ensemble of a top and skirt were created to give an unconventional look as well as using unconventional materials.

This project demonstrates how thinking unconventionally and reusing discarded materials within the fashion industry can reduce textile and additional waste the fashion industry produces daily.



The Relationship Between Consumer Sustainability Knowledge and Their Practices

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*Undergraduate Presentation

Sustainability is important topic, but consumers' lack of knowledge and awareness hinders the motion for change. Consumers want to be environmentally responsible, but they lack knowledge to be more sustainable with their clothing. Therefore, the purpose of this study is to characterize consumer knowledge of sustainability in the fashion industry and understand the importance of sustainability education.

A network sample of adults age 18 and older was solicited and individuals who consented were directed to an online questionnaire. Data was collected regarding consumer sustainability knowledge and practices. Statistical analyses were completed using SPSS.

Ninety-three individuals participated in the survey. Data indicated that the older the consumers, the more knowledge they have about sustainability and sustainable issues. The more knowledgeable consumers, the more likely they are to engage in sustainable practices and agree that it is important that the clothing they buy be made using sustainable practices. There were also correlations between consumers' interest in learning about sustainability issues and their age, knowledge, and practice. The younger consumers are more interested in learning about sustainability issues than middle-age and older consumers. Lastly, the data indicated that the more knowledgeable the consumers, the more they practiced sustainability with their purchases in the last 12 months.

Consumers want to be more sustainable, but they do not have the resources and knowledge to develop more sustainable practices. There is not one simple solution to help make the fashion industry more sustainable, but educating consumers is a good first step.

Consumers' Sustainability Practices: Do Their Purchases Reflect Their Values?

Cora Bonewitz, Dannie Gates, Dr. Kathleen Heiden, Dr. Simone Camel
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*Undergraduate Presentation

Interest and concern for sustainability within the fashion industry has been on the rise. Therefore, the purpose of this study was to explore which sustainable practices were consumers engaging and whether consumers expected brands to also participate in sustainable practices. A network sample of adults age 18 and older was solicited and individuals who consented were directed to an online questionnaire. Data was collected regarding consumer sustainability knowledge and practices. Statistical analyses were completed using SPSS. Ninety-three individuals participated in the survey. Positive correlations were found between clothing consumers buy being made using sustainable practices and (1) brands providing information on their sustainable manufacturing, (2) purchases made in the last 12 months, (3) practicing sustainability within own wardrobe, and (4) household size. In the past 12 months, participants indicated purchasing clothing sustainably. While participants indicated they would be willing to pay more for sustainable products, the percentage they are willing to pay is low. Older, full-time employed consumers more likely that agreed their clothing should be manufactured using sustainable practices. Lastly, the younger the consumers, the more they practiced sustainability with their purchases in the last 12 months. There are relationships between consumers' sustainable clothing purchases and their own sustainable practices. While consumers indicated they engaged in sustainable practices, their actual purchases and behaviors did not always follow their report of engagement. Further studies on consumer sustainability practices should be completed to understand the differences between reported practices and actual behaviors.

Your Kid Won't Obey? Maybe They Should Play!

Claire Guillet, Dr. Tonya Vandenbrink
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*Undergraduate Presentation

While hitting, kicking, and throwing tantrums are considered part of normal development for preschoolers, some preschoolers engage in what is termed aggressive behaviors. Aggressive behavior is characterized by destructive action or behavior that can result in physical and/or emotional harm or violence (Brehm, 2000). Continuous engagement in aggressive behaviors can be detrimental to children's physical, social, emotional, and cognitive development (Obsuth et al., 2015). Play therapy has been used to combat the lifelong negative outcomes associated with the onset of aggressive behavior in the preschool years. Play therapy is extremely influential in the preschool years since children spend a large majority of their time engaged in play and can communicate the big emotions they are experiencing more effectively through play (Davenport & Bourgeois, 2017). There are three main approaches to therapeutic play: psychoanalytic, cognitive-behavioral, and person-centered therapy. The purpose of this review is to evaluate the effectiveness of therapeutic play, specifically in reducing aggressive behavior, and determining.

The Effects of Poverty on Development Throughout Childhood

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*Undergraduate Presentation

Approximately 16.1% of children in the U.S. live in poverty (U.S. Census Bureau, 2022). Poverty refers to the inability to have enough funds to meet basic needs. These are essentials most of us take for granted, housing, food, and clothing. What is more troublesome is the knowledge that children who face poverty do so because of their parents' economic adversity and they themselves do not have the ability to contribute or change their poverty status. Since the pandemic the number of children facing poverty is expected to increase by 150 million globally (UNICEF, 2020). The purpose of this literature review is to outline the negative effects of poverty on development, beginning in infancy and ending in late childhood. These adverse effects can be found across the three domains of development: physical, cognitive, and socioemotional. While many sources show that poverty has a greater impact in the earlier, more formative years, this review hopes to shine light on how situational factors such as poverty can influence development from infancy to preschool, to early childhood, and into late childhood, altering the course of a life from the very beginning. This literature review aligns with this year's academic goal, in the department of Human Ecology at LA Tech, to bring awareness to poverty.

Pedophiles’s Dangerous Access to “Internet Famous” Children: The Dark Side of “Sharenting”

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*Undergraduate Presentation

This research aims to explain, through the review of literature, the extent of pedophiles’ access to “internet famous” children and the potential dangers of such access. “Sharenting” and “family vlogging” are increasingly profitable online careers that lead to the exploitation of nonconsenting young children. In order to minimize the number of children harmed by cyberpedophilia, we must educate parents and families on the perils of oversharing online and provide ways for these individuals to access the internet more safely. Information was gathered from scholarly articles, journals, and child safety organizations to conduct this research. These pieces of literature were gathered through EBSCOhost, an online research database, and Google Scholar. All information gathered is a mixture of secondary data, both qualitative and quantitative. In conclusion, this research presents information on the ways pedophiles access “internet famous” children through their parents’ social media accounts. It presents the dangers of pedophiles having such open access to these children and provides suggestions to parents and families for keeping their young kids safe. As the job title of “influencer” becomes more prominent in society, future researchers will have opportunities to examine the effects of cyberpedophilia on the affected children as they enter adolescence and adulthood.

The Impact of Covid-19 on Adolescent Suicide and Suicide Ideation

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*Undergraduate Presentation

The purpose of this research is to explain, through a literature review and presentation, the impacts of COVID-19 Pandemic on adolescent suicide attempts and ideation. Adolescents have been negatively impacted by COVID-19 and the environmental changes as a result of the pandemic. They have been affected in a wide range of ways, from their emotional and physical state to their relationships with their peers and families. Due to forced isolation, many adolescents are feeling alone and hopeless. These feelings can be long-lasting and affect adolescents in adulthood. In the past, society has ignored the truth that adolescents struggle with their mental health as much as adults. The best way to prevent suicide attempts and ideation is address these issues sooner rather than later, and provide support for these individuals. To conduct and review research related to this topic, quantitative and qualitative information was gathered from articles, journals, and the online database EBSCOhost. The Body of Knowledge was also used to assess how this topic affects children, adolescents, and their families. In conclusion, this research clearly shows that adolescents have been seriously impacted by COVID-19 and the environmental changes brought on by the pandemic. As a society, we must educate and support adolescents struggling with suicide ideation.

Immigration through a Life Course Lens: Is there a difference between Immigrant vs. non Immigrant education in the United States?

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*Undergraduate Presentation

The Body of Knowledge contains two integrative elements: Lifespan Development and Systems Theory. It is clear to see how immigration relates to both elements. Aging immigrants are more vulnerable due to their limited English language proficiency, are more likely to be less educated, more likely to live in poverty, likely to live in isolation, and are likely to be dependent on family support. This in addition to the natural role changes that occur throughout the lifespan can lead to extreme stress and/or crisis. These issues that occur across the lifespan also affect the human ecosystem as a whole. These individual issues highlight factors in both the family's micro and macro environments. The micro-environment of the family is affected by the changing roles as they age and the macro-environment is affected by their English language proficiency. The purpose of this study is to determine how greatly an immigrant is affected by the quality of education they receive in America and how it further addresses them in their future endeavors.

The research suggests that there is a significant difficulty for immigrants, especially using the theory of life course development and seeing how individual immigrants have been affected along with international students. This study is designed to conduct interviews to individual students who are immigrants who are of different ages and seeing their experience over time, as well as international students and comparing their experiences as a college student in a foreign nation. In conclusion, the research shows evidence from many statistics on how prejudices, stress, and cultural shocks greatly affect and strain immigrants' educational and living experiences and this study will further hope to expand on it. Immigrants make up one in eight in America and their livelihoods greatly impact the culture and economy of America and thus are the future and require the attention needed to succeed.

Influences on the Foster Care and Adoption Systems and How Each Have Changed Since Their Origin

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*Undergraduate Presentation

The purpose of conducting this research is to show the similarities and differences between adoption and foster care from the past to the present. By focusing on the influences that have impacted the adoption and foster care sectors, we will be able to compare and contrast effective policies and changes that have been made over the years. Expanding families through foster care and adoption has been a huge trend in our society, and are both proven to have great impacts on the overall structure of family life. By conducting this research we hope to expand the public's knowledge on this topic as well as identify helpful trends that can reinforce the growth of adoption and foster care among families in our society. To conduct this research, information was gathered from scholarly articles, journals, and books. These literature pieces were accessed through EBSCOhost, an online research database. Using the Body of Knowledge in examining our research, there is support for continuing to establish and reform laws and policies to advocate for adoption and foster care to increase the public's awareness and involvement. In conclusion, this research presents the dynamic of foster care and adoption on families and children, both past and present. It also presents shifts in adoption and foster care over the years from changes in policy and society as a whole. In the future, we must continue to implement ways to enhance the adoption experience for everyone involved, and seek to provide a better system in place.

Wastewater Analysis and Genome Sequencing of SARS-CoV-2 Benefit COVID-19 Surveillance

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*Undergraduate Presentation

The COVID-19 outbreak was declared a pandemic on March 11, 2020. Since this declaration, there have been over 281 million cases and over 5 million deaths reported worldwide. Quantitative reverse transcriptase PCR (RT-qPCR) and antigen testing have become the predominant surveillance methods for SARS-CoV-2 positivity, the former being more sensitive to viral load and the latter being more efficient. These testing methods are invaluable, but do not provide an accurate assessment of the total caseload in an area. Wastewater-Based Epidemiology (WBE) involves measuring genome copy units in wastewater to allow a quantitative measure of all cases in the area, including asymptomatic carriers and non-tested COVID-19 positive individuals. This method can predict surges in positivity in the area sampled and may benefit healthcare workers by providing more time for preparation of these surges.

During surges, genomic surveillance analyzes positive patient tests to confirm viral presence and identify the variants present in different areas. This approach leads to the ability to monitor novel mutations as they occur in real-time during emerging and active outbreaks. For SARS-CoV-2, there are numerous mutations of concern and the ability to track their prevalence and correlate with epidemiologic data is invaluable. As sequencing has previously been only available to larger institutions, the ability to sequence samples from rural communities provides a more thorough view of the mutational landscape and their distribution across populations. Combined with WBE, these two methods provide new perspectives that can dramatically increase the effectiveness of public health responses to emerging pathogens.

Binary Bacteriophage Lambda Int Recombinase

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*Undergraduate Presentation

Site-specific recombinase Int mediates integration of the bacteriophage λ genome into the *E. coli* chromosome. Integration occurs once Int, assisted by the integration host factor IHF, forms a high order structure called intasome, within which Int, a heterobivalent protein, interacts with two distantly located, non-homologous DNA sequences: the core recombination sites and accessory arm sites. The binding to these sites is mediated by the C-terminal domain (CTD) and N-terminal domain (NTD) of Int, respectively. Within Int, the NTD can activate or inhibit the recombination activity of the CTD depending on whether the NTD is bound to the arm sites. When the NTD and the CTD are mixed together as individual polypeptides, the NTD can activate some activities of the CTD but not recombination. We show here that a single modification allows the CTD to recombine the core sites: the int-h mutation (E174K) which stabilizes λ Int on DNA. When the CTD(E174K) is further modified by extending its N-terminus toward the NTD, the recombination activity of this CTD variant can be greatly stimulated by the NTD on the substrates that contain the arm sites. The resultant binary λ Int efficiently recombines the attP/attB and COC'/COC'-P' substrates. We also found that shortening or lengthening of the NTD decreases its ability to stimulate the recombination activity of the CTD. Our results suggest a mechanism by which the N-terminal and the C-terminal domains of Int interact and provide insights into the molecular basis of the regulation of the λ Int activity.

Role of the Notch Signaling Pathway in Human Adipose-Derived Stem Cells

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Human adipose stem cells are easily obtained multipotent stem cells that have the potential to change medicine. The ability of stem cells to be used broadly, however, is limited by our lack of understanding. If the mechanisms that define and determine stem cell state and behavior are better understood, these cells may be used to treat degenerative disease and injury. The Notch signaling pathway is a conserved, complex cell signaling pathway that regulates cell state, proliferation, differentiation, and fate. The focus of my research is to determine the role of the Notch signaling pathway, specifically Notch 1 and 3, in stem cell self-renewal, proliferation, and morphology. We evaluated the influence of gene-specific siRNA-mediated knockdown to reduce the expression of Notch 1 or Notch 3 and impact cell state. We are using these knockdowns to monitor proliferation and self-renewal by monitoring Ki-67 expression, performing colony-forming unit assays, and measuring metabolism. Staining of actin filaments and microscopy imaging will allow us to visualize changes in cell morphology and cell state for each of these knockdowns. Together, these assays will allow us to determine the role of Notch 1 and Notch 3 on adult stem cell state, which contributes to our overall understanding of how these characteristics may be manipulated and used to treat degenerative disease.

Distribution Model for the Louisiana Slimy Salamander (*Plethodon kisatchie*)

Taylor Thomisee, Dr. Don Shepard

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*Undergraduate Presentation

Conserving species requires accurate knowledge of their distributions, but this information can be hard to obtain for species that are difficult to survey because of their secretive habits. Species distribution modeling (SDM) uses species occurrence and environmental data in a Geographic Information Systems (GIS) framework to identify areas where a species is likely to occur. These methods have proven useful for identifying unexplored areas of suitable habitat that can then be targeted with on-the-ground surveys. The Louisiana Slimy Salamander (*Plethodon kisatchie*) occurs in northern Louisiana and southern Arkansas, and is a species of conservation concern. Little information is available about the species' current distribution and population status, and comprehensive surveys are needed. To guide future surveys, we generated a distribution model for *P. kisatchie*. We compiled geographic coordinates for 62 slimy salamander locations in northern Louisiana and southern Arkansas from museum collections and the literature. We then thinned these to a subset of 34 points that were >5 km apart in order to reduce sampling bias. Next, using correlation analysis, we selected 8 temperature and precipitation variables from among the 19 bioclimatic variables of the WorldClim project. We clipped these variables to our study area and then created a SDM in the program Maxent. The resulting SDM showed several suitable areas where *P. kisatchie* may occur that have not been previously surveyed. The SDM also showed a large area along the Arkansas-Louisiana border with no previous records is unsuitable for the species.

Comparison of the Chemotactic Behavior of Halloysite, Bone Morphogenetic Factor 2 (BMP-2), and BMP-2/HNT Composites

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Effective bone repair requires rapid tissue regeneration at bone defect sites. Recent studies have shown that endogenous growth factors can induce pre-osteoblast and osteoblast migration to the damaged tissue site. However, delivery of growth factors has some disadvantages, including a short half-life that requires high GF dosage concentrations to preserve a therapeutic release profile. This effect increases patient costs and long-term complications resulting from high growth factor doses. Halloysite nanotubes are aluminosilicate clay with a hollow tubular structure. Doping of growth factors into the HNT lumen has been shown to provide sustained release of bioactive factors. This preliminary study compared the chemotactic potential of native (undoped) HNTs, BMP-2, and HNTs doped with BMP-2 (HNTs/BMP-2) using a transwell migration assay. The MC3T3-E1 (subclone 4) mouse pre-osteoblast was used as our model cell type. BMP-2 is a growth factor with recognized chemotactic properties. Data from several sets of experiments show that pre-osteoblasts migrated in the presence of HNTs and HNTs/BMP-2 showed a more effective migration rate when compared with controls. Of all the BMP-2-doped HNT groups, BMP-2 at a 5 ng/ml concentration showed the migration rate. These results indicate that HNTs and HNTs doped with BMP-2 have potential as new scaffolding osteogenic agents for bone regeneration.

Astrocyte-Derived Extracellular Vesicles as a Novel Approach to Reduce Brain Endothelial Cells Oxidative DNA Damage

Ruth Stewart, Dr. Gergana Nestorova
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Cellular oxidative stress is associated with the development and progression of neurodegenerative diseases including Alzheimer's, Parkinson's, Huntington's disease, and amyotrophic lateral sclerosis. The most common biomarker of oxidative DNA damage is 8-OHdG, an oxidized derivative of deoxyguanosine that if not repaired leads to C: C to A: T transversion in the DNA. The adduct is excised from the genome by the glycosylase OGG1. Increased levels of 8-OHdG are implicated in age-related neurological disorders, carcinogenesis, cardiovascular disease, inflammation, and aging. The scientific objective of this study is to investigate the effect of astrocytes-derived exosomes on oxidative DNA damage in cells using human brain endothelial cells (HBECs). Exosomes are extracellular vesicles (EV) that play a major role in cell-to-cell communication via the transfer of nucleic acids, proteins, and lipids from the cell of origin to the recipient cells. EV possess many important properties useful for drug development, including low immunogenicity and the capacity to be 'loaded' with nucleic acids and bioactive molecules by modifying the parent cell which releases them. EV can cross the blood-brain barrier (composed of human endothelial cells (HBEC), pericytes, and astrocytes end-feet) to transport their physiologically active cargo. The central hypothesis of this study is that astrocytes-derived EVs will reduce oxidative DNA damage and ROS levels in HBEC. RT-qPCR analysis of exosomal RNA indicated that OGG1 mRNA is expressed in the EVs. Therefore, horizontal transfer of the EV astrocytes-derived OGG1 mRNA cargo via endocytosis or fusion with the membrane of the recipient HBEC membrane is expected to lead to a reduction of oxidative DNA damage as measured via 8OHdG genomic accumulation and HBEC OGG1 mRNA expression. Treatment with sodium dichromate (100 μ M, 1mM) for 16 hours was associated with a significant increase in ROS levels ($p < 0.05$) and 45% percent reduction of cells that remain attached to the lower surface of the flask. HBECs were divided into three groups: nontreated (baseline), treated without exosomes, and treated with exosomes. The treated groups were exposed to sodium dichromate in two different concentrations, 100 μ M and 1 mM, and incubated for 16 hours. The ELISA results indicated the addition of exosomes in the 100 μ M group resulted in a statistically significant reduction of genomic 8-OHdG accumulation. RT-qPCR results show that OGG1 mRNA levels are increased after treatment with 100 μ M and 1mM sodium dichromate. The successful results of this research will provide insight into the EVs mediated neuroprotective effects for the development of alternative treatment for neurodegenerative disorders, such as stroke, amyotrophic lateral sclerosis, Parkinson's disease and Alzheimer's disease.

The Curious Case of Lead: Do Dabblers or Divers Accumulate More Lead in Their Tissues?

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*Undergraduate Presentation

Lead is a toxic heavy metal that has negative effects on wildlife and humans. Because of this, lead shot was banned in the US in 1991. However, lead is naturally present in the environment and lead shots can remain available in the environment for many years. As result, ducks can accumulate lead into their tissues. Thus, ducks are commonly used as bioindicators. We assessed liver lead concentration of wintering ducks that were donated by hunters from around Louisiana. Ducks can be split into two groups based on their diets and mode of feeding: dabblers and divers. We hypothesized that diving ducks would accumulate more lead in their livers because they feed at a higher trophic level than dabblers. Liver lead concentrations from different species of dabblers and divers were measured using energy-dispersive X-ray fluorescence (EDXRF). A greater proportion of diving species had liver lead measurements above the EDXRF lower limit of detection (0.2 ppm) than dabblers (divers: $p = 0.65$, dabblers: $p = 0.34$; Fisher's exact $P < 0.001$). Of those individuals with measurements above the limit of detection, divers had higher liver lead concentrations ($F_{1,63} = 5.86$, $P = 0.018$, $R^2 = 0.09$). Our results indicate that diving species are at greater risk of lead poisoning than dabbling species. Our study provides information about the distribution of lead in Louisiana's wetlands and about the potential risk to human health from consuming duck meat.

Pollinator Diversity on a Shortleaf Pine-Oak-Hickory Restoration Site

Taygan Kohlman, Dr. Natalie Clay

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*Undergraduate Presentation

Pollinators play a critical role in increasing plant reproduction and increasing genetic diversity. Human land use changes often decrease plant diversity and pollinator species. However, ecosystem restoration can reverse these patterns. Northern Louisiana was historically dominated by shortleaf pine-oak-hickory forests but has been converted largely to loblolly pine forests with little-to-no herbaceous ground cover. The objective of this study is to determine how different management practices on a short leaf pine-oak-hickory forest restoration site affect the pollinator diversity compared to no restoration. We predicted prescribed burning and herbicide treatment would increase pollinator species diversity and abundance. We sampled pollinators on three management regimes: 1) burned with active herbicide treatments for non-desirable plant species, 2) just burned, and 3) no restoration. At each site we set out 20 pan traps, five pink, five blue, five yellow, and five clear bowls that contained ~200 ml of a water with soap. Pan traps were placed 5m apart in an “x” shape and left out for 24 hours. Sites were sampled as part of a pilot study. We found slightly greater diversity, evenness, and richness where burning took place compared to the control plot with no restoration. Specifically, the burned site had ~1.5 times higher diversity than the control site and the burn plus herbicide site was most similar to the control site. Understanding how restoration and forest management impacts pollinator communities allows stakeholders to make informed decisions about appropriate management strategies for desired outcomes.

Landscape Factors Associated with Spatial Patterns of Reptile Road Mortality

Brianna Bassett, Dr. Don Shepard
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*Undergraduate Presentation

With the expansion of roadways for human travel, road mortality has become a significant cause of death in many wildlife species. Identifying areas of high road mortality (hotspots) and their associated landscape features is important for implementing mitigation strategies. We collected data on snakes and turtles killed on roads around Carlyle Lake, Illinois from April 2000 to November 2022. For five snake species and two turtle species, we used ArcGIS to analyze spatial patterns of road mortality to identify hotspots and determine the landscape variables associated with road mortality. We identified hotspots in some species that were associated with specific landscape variables, but road mortality in other species was randomly distributed. Variation among species appeared to be related to their ecology (e.g. forest-associated, grassland-associated, semiaquatic, habitat generalist). Based on our results, we make specific recommendations to reduce road mortality of these seven species that will aid in their conservation.

Cell Co-Culture Microfluidics Platform with an Integrated Hydraulic Valve for Controlled Interaction of Brain Endothelial Cells and Astrocytes

Faria Binte Hossain, Dr. Gergana Nestorova
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*Graduate Student Presentation

Integration of lab-on-a-chip systems for real-time analysis of brain cells communication is an emerging topic of neuroscience research that promises to overcome one of the big challenges of our time: understanding brain functionality. Astrocyte and HBEC-5i co-culture provide in vitro model of the blood-brain barrier. To apply lab-on-a-chip devices for cell co-culture applications in research settings, it is important to identify the optimal device geometry and fabricating materials that are not cytotoxic and ensure proper adherence of the cells. Controlled and reversible separation of cell culture chambers is crucial for real-time studies of extracellular-mediated cell-to-cell communications. Therefore, the main scientific question addressed in this study is to identify the optimal dimensions of a 3D printed cell co-culture microfluidic platform that can allow the cells that enable controlled separation of the chambers and provide the long-term viability of the cell lines. The platform under study consists of two $27.5 \text{ mm} \times 35 \text{ mm} \times 10 \text{ mm}$ cell culture chambers separated by an Elastic Resin-fabricated hydraulic valve ($10 \text{ mm} \times 35 \text{ mm} \times 9.5 \text{ mm}$). The actuation of the valve is controlled using hydraulic pressure exerted by the chamber positioned directly above the valve. The deflection of the valve barrier provides separation of the cell chambers and the individual microenvironments. Upon the release of the pressure, the valve returns to its original position and allows the exchange of signaling molecules between the cells. The lower glass channel wall of the microfluidic device was coated with gelatin or PDA/collagen to provide cellular attachment for HBEC-5i cells and Poly-L-Lysine (PLL) for astrocyte and enhance the growth and proliferation. The polyelectrolyte attachment efficacy on the glass slide was assessed via atomic force microscopy (AFM). The AFM study shows that the attachment levels of the Poly L Lysine and Gelatin remain stable over time. The viability of the cell was assessed using fluorescent-based methods.

Sex Differences in Hepatic Lead of Water Fowl

Aspen Frazier, Dr. Terri Maness

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*Undergraduate Presentation

Lead is a non-essential heavy metal that is toxic to animals. Sublethal effects are seen at liver lead concentrations ranging from 2-6ppm and signs of clinical poisoning are seen at concentrations greater than 6ppm. Waterfowl are particularly vulnerable to lead poisoning because they often consume lead shot. In 1991, lead shot was banned in the United States. Despite this ban, there is still a significant amount of lead shot in the environment. Waterfowl suffering from lead poisoning usually exhibit loss of appetite and progressive weight loss. Males and females differ in their physiology, morphology, and behavior, so they may differ in their consumption or processing of lead. We examined sex differences in hepatic [lead] of wintering waterfowl donated by hunters in Louisiana. Previous work in this area has focused on breeding birds, while few studies have examined sex differences during the nonbreeding season. Breeding females tend to have lower body burdens than males due to the loss of metals through egg-laying, an avenue of detoxification not available to males. We predicted that wintering females would have higher liver [lead] than males because the larger males have higher metabolic rates that may allow them to process the lead faster than the females. To study the accumulation of lead, liver samples were analyzed with energy-dispersive X-ray fluorescence. Our results provide insight into sex differences in accumulation of heavy metals during the nonbreeding season and can be used assess the distribution of lead in Louisiana's waterways.

Updated Geographic Ranges of Two Slimy Salamander Species

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Assessing extinction risk and conservation needs of species requires information about geographic range size and occurrence locations. The Slimy Salamander complex comprises species that are indistinguishable morphologically, making it difficult to identify species and determine their distributions without genetic data. We focused our work on two Slimy Salamander species in the Ouachita Mountains of Arkansas and Oklahoma. *Plethodon kiamichi* was described from only 3 locations on Kiamichi Mountain, while *Plethodon albagula* has a larger range that circumscribes Kiamichi Mountain. The previous work on which these distributions are based had limited geographic sampling; more fine-scale sampling is needed for more accurate geographic range mapping. We analyzed mitochondrial DNA sequences of 222 individuals from 148 locations throughout the Ouachita Mountains, including Kiamichi Mountain, to identify species and determine their distributions. Our results show *P. kiamichi* is more widespread than originally thought, and *P. albagula* actually occurs with *P. kiamichi* at some of its newly identified localities. This new geographic range information will be useful for conservation efforts, especially for *P. kiamichi*, which is considered imperiled (G2) due habitat fragmentation and regular clear-cutting.

3D Printed Implants for Tissue Regeneration and Enhanced Antimicrobial Activity

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Introduction: Before introducing nanoparticles, a thermoplastic such as polyetheretherketone (PEEK) or Titanium was used in the medical and dental fields as an implant. However, silicon nitride (SN) has enhanced osteogenic, hardness, and antimicrobial properties (Luo et al. 2020). This research aims to introduce antibacterial properties into fabricated 3D Implants by combining antimicrobial and base polymer powders before processing for tissue regeneration.

Methods: A patented electrodeposition process was used to coat magnesium (Mg) on the HNT outer surfaces to add additional antimicrobial properties. Coated MgHNTs were added to SN and PLA to create composite implants. Material characterization was used to confirm the presence of Mg on HNTs. Antimicrobial activity was tested against *Escherichia coli* and *Staphylococcus aureus*. Preosteoblast evaluation and mechanical testing were done on the composites.

Results: Antimicrobial testing showed a pronounced inhibition of bacterial growth. The effect of silicon nitride and metalized HNT on the preosteoblasts in vitro was nontoxic and enhanced cell proliferation. In addition, the composite implant shows greater flexural strength and hardness.

Conclusion: Fabricated SN/HNT composite implants showed outstanding mechanical, excellent bacteriostatic properties, osteogenic and osseointegration activity, which makes them potential orthopedic applications as bone

Luo, Y.; Humayun, A.; Mills, D.K. (2020) Surface modification of 3D printed PLA/halloysite composite scaffolds with antibacterial and osteogenic capabilities. *Appl. Sci.* 2020; 10: 3971.

Identifying Lethal Alleles in Human

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Lethal alleles have long been described as the lack of a living homozygous recessive offspring from two carrier parents. Because it is unethical to perform specific crosses in Human to identify which genes may be lethal, we seek to identify analytical methods to identify a subset of Human gene mutations that could be lethal. We have identified highly conserved genes within the 19,992 genes identified in human. In addition, we have identified disease-causing genes based on the Online Mendelian Inheritance in Man (OMIM) resource. By combining these and other data, we hope to identify genes with a high probability of lethality in humans when inherited as homozygous recessive (non-functioning) or homozygous dominant (negative-functioning) alleles.

Effects of Leaf Litter Biodiversity on Stream Invertebrate Colonization and Biodiversity

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Biological diversity is important to the stability and functioning of ecosystems. Understanding how biodiversity impacts colonization is important, as colonization is a major factor determining what organisms will inhabit a particular ecosystem. Leaf litter plays an important role in energy flow in streams as it provides a major organic energy source for colonizing invertebrates. Understanding this relationship between leaf litter biodiversity and colonization would allow better understanding of stream colonization processes and the importance of leaf biodiversity, yet these relationships remain unclear. My research will examine the effects of leaf biodiversity on colonizer diversity and abundance. I will create mesh bags containing leaf mixtures with different levels of tree species richness and functional diversity. Functional diversity is the diversity of traits that influence ecosystem function. This will be estimated using the following leaf chemical traits: tannin concentration and CN, CP, and NP ratios. After placing leaf bags into streams and retrieving them at different time periods, we will be able to examine leaf decomposition and identify colonizers to determine what effects leaf biodiversity may have. This research is important, as it may allow greater insight into forest and stream conservation practices and improve understanding in how changes to a plant landscape may impact stream ecology.

Mercury Rising in the Tissues of Louisiana's Waterfowl

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*Undergraduate Presentation

Mercury is a nonessential heavy metal that negatively impacts the health of humans and wildlife. Many of Louisiana's waterways have fish consumption advisories due to mercury contamination. These advisories do not provide guidance about the consumption of birds that may feed on these fish. We measured hepatic mercury of waterfowl that were harvested by hunters throughout Louisiana. We expected ducks that feed at higher trophic levels (divers) would have greater hepatic [mercury] than those that feed at lower levels (dabblers). Liver [mercury] was determined with energy-dispersive x-ray fluorescence. Our results showed that divers did have more [mercury] than dabblers ($F_{1,222} = 10.08$; $P = 0.002$; $R^2 = 0.04$). Mercury concentration in most duck livers was greater than the limit where fish consumption is not advised. Our results imply that consumption of duck meat in Louisiana may be harmful, especially diving species. Establishing consumption advisories for waterfowl in Louisiana may be warranted, as has been done in Utah.

Fowl Play: Presence of Lead Shot is Related to Concentration of Lead in Waterfowl Livers

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Chronic lead exposure can lead to reduced IQ in humans and lead poisoning is known to kill millions of birds each year. Waterfowl are particularly vulnerable to accumulated lead shot in waterways. Managers often monitor risk to wildlife in an area by measuring hepatic lead concentration of waterfowl. As this measurement is expensive, researchers often dissect the GI tract and birds with lead shot in their gizzards are selected for further analysis. We investigated whether liver [lead] corresponded with presence of lead shot in the gizzards of waterfowl donated by hunters at Catahoula Lake, Louisiana. Catahoula Lake sediments are known to contain high levels of lead shot. Lead toxicity is known to negatively impact the immune system, which may lead to increased occurrences of parasitic infections, so we also looked for intestinal parasites. We predicted that waterfowl with lead shot in their GI tract would have elevated liver [lead] and that ducks with elevated liver [lead] would be more likely to have intestinal parasites. We found that ducks with lead shot had higher liver lead than ducks without lead shot (Mann-Whitney $U_{4,34} = 20$, $p = 0.02$). However, liver lead concentration was unrelated to presence of GI tract parasites. Our results show that there is a relationship between the concentration of lead in waterfowl livers and the presence of lead shot and that using lead shot to select birds for liver lead measurement is appropriate.

Engineered Chitosan-Based Biopolymer Composite for Enhanced Wound Healing Applications

Abdul-Razak Masoud, Dr. David Mills
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Introduction: Wound dressings are topical materials applied to the surface of wounds to enhance the healing process by reducing healing times and preventing complications through bacterial infections¹. Despite the advances in material and tissue engineering, existing wound dressings are far from ideal and should preferably be biodegradable, prevent infections, enable gas exchange, ensure optimal wound-surface temperature, have a good sorption capacity concerning wound exudates². Natural biopolymers are the most suitable materials that could potentially be engineered to possess a majority of the properties of an ideal wound dressing. They provided properties such as biocompatibility, biodegradability, low toxicity, and cell signaling and are tunable to have additional functionalities such as improved mechanical and antibacterial properties when incorporated with biomaterials³. This study aims to fabricate a biodegradable, biocompatible, bioactive hydrogel-based wound dressing using chitosan (CTS) and carboxymethyl cellulose (CMC) polymers incorporated with metal-coated halloysites (mHNT) to enhance antibacterial properties.

Materials & methods: CTS and CMC were crosslinked according to Lai, W. F. et al.⁴ with some modifications. The cross-linked composite was impregnated with metal-coated HNT loaded with antibiotics for additional functionality. The microtitration method was then used to test the inherent antimicrobial properties of chitosan, carboxymethyl cellulose, halloysites, antibiotic-loaded halloysites, metalized halloysites, and antibiotic-loaded metalized halloysites against *E. coli* at different concentrations.

Results & conclusion: The preliminary antibacterial studies showed that all the samples had antibacterial properties against *E. coli*, with the antibiotic-loaded metalized halloysites suppressing bacterial growth most effectively. Further tests including FT-IR, swelling tests, rheological studies, and cell proliferation assays were performed to characterize the fabricated wound dressing and the obtained results suggest that the dressing is biocompatible and effectively suppresses bacterial growth.

Spatial Patterns of Genetic Diversity and Divergence in The Slimy Salamander: *Plethodon kisatchie*

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Slimy Salamanders of the *Plethodon glutinosus* species complex are a classic example of cryptic species for which species boundaries and relationships have proved difficult to determine without genetic data. This complex of 13 morphologically similar species was once thought to be a single species ranging across the eastern United States, but gene and protein analysis techniques revealed high levels of genetic divergence among geographically distinct groups of populations. In some cases, these groups (i.e., species) were separated by geographic barriers such as rivers. This study aims to investigate geographic patterns of genetic diversity and divergence within one species of this complex, the Louisiana Slimy Salamander (*Plethodon kisatchie*). This species was described based on analysis of proteins from three populations between the Ouachita and Red rivers, but is known to occur on the opposite sides of these large rivers as well. Previous work has also found *P. kisatchie* is patchily distributed and some areas are separated from others by large expanses of unsuitable habitat. Because rivers and unsuitable habitat are commonly accepted barriers to dispersal and gene flow, we hypothesize that some populations of *P. kisatchie* are genetically divergent and may represent species distinct from *P. kisatchie*. We are obtaining samples of *P. kisatchie* throughout its distribution for genetic analysis. Preliminary genetic analysis of samples from three populations indicate Union County, Arkansas and Grant Parish, Louisiana individuals are more closely related to each other than they are to LaSalle Parish, Louisiana individuals, despite being separated by predicted unsuitable habitat.

The Prevalence of Consanguineous Mating in Autosomal Recessive Disease

Johnathon Schluter, Dr. Jeff Shultz

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*Graduate Student Presentation

Lethal alleles have long been described as the lack of a living homozygous recessive offspring from two carrier parents. Because the occurrence of a recessive disease is contrary to the definition of a lethal allele, we sought to identify recessive inheritance diseases as a way to remove the underlying genes from further investigation as lethal alleles. It became anecdotally evident when investigating autosomal recessive disease that a substantial number of reported cases are the result of related (consanguineous) mating. We analyzed ~600 peer-reviewed manuscripts reported within the last 20 years to identify the percentage of cases presented in which consanguineous mating was indicated, the underlying genes (novel gene or new mutation) and geographical region. Approximately 67% of the publications reported a consanguineous mating and were skewed to novel mutations, rather than novel genes.

The Impact of Leaf Litter Diversity on the Colonization of Aquatic Insects in Pools

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Aquatic ecosystems are composed of discrete patches of suitable aquatic habitat, which are separated by terrestrial systems. Thus, many aquatic insects must move between patches to establish themselves. Aquatic insects face many dangers in moving between patches and so must be efficient at assessing habitat quality to ensure successful colonization. One of the largest drivers of colonization is the quality of leaf litter. Leaf litter diversity affects community structure and litter decomposition. However, it is unclear how leaf litter diversity affects colonization. We will be examining how species richness (the number of species) and functional diversity (the diversity of functional traits assessed as leaf chemistry) shapes and drives the colonization of aquatic insects. To do so, pond mesocosms will be deployed with 4 different levels of leaf litter richness and a gradient of leaf functional diversity. Leaves will come from 20 different species of trees and will be submerged in mesocosms. Mesh will be placed over the leaves and pressed into the water so that all colonists can easily be collected. The colonists will be identified to species and are expected to largely consist of the aquatic beetles, dytiscids and hydrophilids, and the mosquito genus *Culex*. The levels of functional diversity and richness of leaf litter will be assessed as predictors of aquatic insect diversity. We will pair this taxonomic data with chemistry data from the leaf litter as well as water quality. This research has implications for land management, biodiversity, and ecosystem health.

Freshwater Pulses Facilitate Water Hyacinth Survival in Low Salinity Estuarine Habitats

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*Undergraduate Presentation

In Louisiana, river diversions are being used to divert water and sediment from the Mississippi River into estuaries to rebuild wetlands. These diversions lower estuarine salinities extending the range of freshwater organisms, including invasive species. Water hyacinth (*Eichhornia crassipes*) is an invasive floating freshwater plant that forms dense mats that limit boat navigation and alter the structure of aquatic communities. Hyacinth is a freshwater plant, but it can survive in low salinity estuaries (<5ppt). Raising estuary salinity by periodically closing diversions could limit the plant's distribution, but we need further information on how salinity interacts with freshwater pulses (i.e. diversion openings) to impact hyacinth survival. Thus, we exposed hyacinth to 0 ppt, 2 ppt, or 4 ppt salt for 14 days to mimic conditions of a low salinity estuary. We then mimicked a freshwater pulse by placing half the plants into freshwater for 14 days. We measured salt stress and survival by assessing growth using plant wet weight, percent water weight of leaves, and proportion of dead leaf tissue. 2ppt treatments did not limit the growth and survival of hyacinth, but 4ppt exposure over 28 days resulted in no growth and plants appeared to be decaying and dying. 4ppt pulsed plants grew post salt exposure, suggesting that hyacinth can recover and survive saltwater exposure when experiencing freshwater pulses. Results from this experiment suggest salinity should be greater than 4 ppt for more than 28 days to kill hyacinth in Louisiana's Barataria and Breton Sound estuaries.

Growth Rates and Cost Effectiveness of Grazing Calves on Pearl Millet or Pearl Millet-Forage Soybean Pastures

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*Undergraduate Presentation

There are many types of cattle operations, all of which require meeting the nutritional needs of cattle and farmers want to do this in the most efficient manner possible. Planting appropriate annual grasses and legumes for cattle to graze that will increase performance and reduce costs is very important. In this study, two types of vegetation, pearl millet (PM) and a blend of pearl millet with forage soybeans (PM-SB) were compared. Thirty (30) commercial calves were randomly allotted (n=15) to graze either PM or PM-SB paddocks for 90 days. Each group of calves rotationally grazed six 2 ½ acre paddocks weekly for the duration of the study. Grass samples were collected to determine nutrient content (dry matter, protein, neutral detergent fiber, acid detergent fiber, crude fiber and ash) via proximate analysis. On days 0, 45 and 90 of the study, calves were weighed and body condition scored (BCS) according to approved IACUC guidelines. No differences in BCS by sex, treatment or the sex by treatment interaction ($P > 0.48$; $P > 0.69$; $P > 0.33$, respectively) were detected. Likewise, no differences ($P > 0.44$) in average daily gain were detected for calves grazing PM or PM-SB paddocks. Protein, crude fat, ash and moisture decreased and crude fiber, acid detergent fiber and neutral detergent fiber increased in both treatment groups with no differences ($P > 0.84$) between groups in the change in nutrient content over time. Cost per pound of gain was two times higher for the PM-SB treatment (\$1.20 per pound gained) when compared to the PM treatment (\$0.61 per pound gained). Based on these data, mixing forage soybeans with Pearl Millet for grazing would not be nutritionally advantageous or cost effective.

Influence of Understory Vegetation Structure in an Afforested Bottomland Hardwood on Avian Abundance and Species Richness

Colten Wilkerson, Dr. Heidi Adams,
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Bottomland hardwood forests (BHF) cover about 2.8 million hectares of the original 10 million hectares that once existed in the southeastern United States. These losses have led to an emphasis on afforestation of retired agricultural land. As these afforested stands mature, however, wildlife use of these areas may be influenced by successional changes in forest structure. For instance, avian species composition and abundance may be influenced by the understory structure of the forest, which is directly influenced by canopy closure. Thus, our research objective was to evaluate avian abundance and species richness in an afforested bottomland hardwood near Coushatta, LA in relation to the understory vegetation structure. During the summers of 2016-2018 avian point count surveys were conducted at 28 randomly selected points at the study site. Also at each point prior to beginning the survey, percent ground cover and understory vegetation height were estimated. With this data, we will determine if percent ground cover and/or vegetation height influence avian abundance and species richness. If there is a significant influence, we will develop a model that describes the relationship between understory vegetation structure and the associated avian community. Results from our study will be used to help evaluate habitat use by birds in other afforested bottomland hardwood forests of the southeastern United States.

Three- Year Growth Results of Improved American Sycamore

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Xyella fastidiosa is a plant pathogen that affects a wide range of hosts that spreads through the root grafts. Symptoms found on hosts include defoliation, foliar wilt, and leaf scorch. Symptoms appear in late summer to early fall. Once one tree is infected, *X. fastidiosa* will spread to surrounding trees, which can result in death of the tree. American sycamore (*Platanus occidentalis*) is specifically susceptible to this pathogen. Using ELISA, an enzyme immunoassay to detect *X. fastidiosa*, it can be determined if the selected leaves from Louisiana Tech's Arboretum are infected with the pathogen. A few leaves from each tree are collected and separated into their respective genetic families. A sample of the mid rib of each leaf is cut and tested with the ELISA. In order to understand how the test works, there are negative and positive controls added to the test. When completed correctly, the positive test well will be yellow in color. While the negative control will not have any color. Using this test for these sycamores will help prove if there is one genetically different family that is more susceptible to *X. fastidiosa* than other families.

Effect of Pathological Issues and Production Practices on Carcass Quality Harvested in North Louisiana.

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*Undergraduate Presentation

This project is a multi-year endeavor to determine the production trends of cattle harvested in North Central Louisiana at the Louisiana Tech Meat Science Laboratory. Our research is designed to investigate the effect of daily production practices and pathological conditions that affect the quality and yield of the meat with the goal of informing producers of methods to improve their management and increase their return on investment. The study utilizes data collected from 284 heads of cattle presented for harvest from January 12, 2021, to February 21, 2022. In our data collection process, each offal item is removed from the carcass, weighed individually, and returned for inspection by State Inspectors. During harvest, any physiological or pathological conditions are recorded. A primary element that we want to emphasize from this presentation is exhibiting how the data has evolved throughout this year in comparison to the previous year's data. Research in our current and years past data has indicated that pathological issues and production practices will have an impact on dressing percentage and total carcass value. From our data collected, 58 cattle have some type of physiological defect of importance. One in every seven cattle in this project has shown some form of liver condemnation. Of the 284 cattle harvested, the dressing percentage ranged from 33.2% to 67%. Most variation is correlated to the wide variety of cattle harvested. Classes of cattle included 16 bulls (intact male), 17 cows (matured female), 34 heifers (young females), and 197 steers (castrated male).

Erosion and Sedimentation Entering Lincoln Parish Park: Problem and Remediation Solutions

Brock Beaubouef, Tate Bratcher, Morgan Creel, Garrett Holman, Jacob Jester, Benjamin Olivier, Justin Taliaferro, James Ramsaur and William Patterson
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FOR 402 Watershed Management students witnessed sediments entering Creek at Lincoln Parish Park, located just North of Ruston LA. Erosion and sedimentation occurred during a 3.1 inch precipitation event on March 22, 2022. These sediments affected the color of the waterfall, a main attraction of the Park, and are accumulating in two ponds, and affecting clarity of Hoogland Lake. Hoogland Lake is used for boating, swimming, and fishing, and has a scenic walking and biking trail around it. Much of these sediments are originating from recent home construction on Shade Tree Trace subdivision, adjacent to the East boundary of the Park on the North side. Several homesites have implemented erosion reduction techniques, but erosion and sedimentation from the subdivision persists. Students in FOR 402 Watershed Management course are designing solutions to reduce erosion at the source and downstream sedimentation. This management plan includes obtaining multiple landowner objectives, mapping watersheds and source areas for erosion, measuring water quality upstream and downstream, and design, budgeting, and implementation of remediation techniques, such as revegetation, rocks, wattle, haybales, and checkdams.