

## Abstracts

### Nicholls State University

#### Oral Presentations

*Water Quality and the Presence of Antibiotic Resistant Bacteria in the Bayous of Terrebonne Parish in Southeastern Louisiana, USA*

**Bincy Biju**

Faculty mentor: Dr. Raj Boopathy

Antibiotic resistance has become a significant public health concern due to the improper consumption and disposal of antibiotics. Improper handling often leads to selective pressure among bacteria that can lead to antibiotic resistance. Terrebonne Parish, being heavily populated, is dependent on its bayou for its seafood, recreational activities, transportation, and source of living. The water quality of Bayou Terrebonne and Bayou Petit Caillou has never been monitored before even though it was heavily used. The purpose of this study was to monitor the water quality of Bayou Terrebonne and Bayou Petit Caillou. Four sites along the bayou were monitored for water chemistry, total and fecal coliforms, and antibiotic resistance. The water samples were collected in triplicate and checked for the presence of antibiotic-resistant bacteria, coliforms organisms, and the levels of carbon, nitrogen, ammonia, sulfate, and phosphate. The antibiotics tested on samples includes tetracycline, penicillin, amoxicillin, sulfamethoxazole-trimethoprim, bacitracin, streptomycin, meropenem, and erythromycin. The results showed that the bayou meets the criteria set by the Louisiana Department of Environmental Quality (LDEQ) for water chemistry except for sulfur concentration. The amount of total and fecal coliform exceeds the water quality standard due to fecal contamination from the discharge of untreated and/or under treated domestic wastewater from failing septic tanks and individual household sewage treatment systems along the bayous. Many antibiotic resistant bacteria were isolated from the water samples. The water is heavily impaired by the fecal contamination due to improper disposal of individual sewage treatment plant from households along the bayou.

Oral session 3D

*The Coens and Existentialism: The Bleak Worlds of Inside Llewyn Davis and A Serious Man*

**Gabrielle Blanchard**

Faculty mentor: Dr. Scott Banville

Within the scope of film studies, auteur theory—the belief of a singular artist whose creative vision is realized in a manner that is stylistically unique and identifiable—remains prevalent as a lens through which to analyze film and its attributes. Despite its controversial condensing of the collaborative art of film into simply the vision of its director, analyzing films this way can be beneficial, especially when concerning directors such as Ethan and Joel Coen whose careers have spanned decades and resulted in a filmography that serves as a reflection of their nuanced worldview. Throughout their filmography, the Coen brothers have garnered a reputation for their skill in subverting genre tropes, the strength of their style, and their repetition of lesser-known character actors in multiple films. However, a major aspect of their presence as auteurs that is frequently overlooked is the prevalence of themes of death, fruitless endeavors, and failing relationships which all contribute to the pervasive hopelessness of the Coens' worldview. This sense of impending doom and the elegiac introspection of one's self and one's role can be explored most thoroughly through their films *A Serious Man* (2009) and *Inside Llewyn Davis* (2013). These themes pervade much of their oeuvre and convey the Coen's view of the complexity of the world: while it may seem austere and unforgiving, the world is what the individual makes it to be, and in Larry Gopnik and Llewyn Davis's case, through inaction and an unwillingness to evolve, they make their world inhospitable.

Oral session 3B

## *Soft Skill Development in Academia: A Response to Workforce Needs*

**Tina Granger**

Current workforce development initiatives indicate that employers are seeking applicants with high levels of soft skills. Soft skills are interpersonal attributes that increase productivity through good communication styles, the ability to make informed decisions, conflict resolution or mediation skills, resiliency, cultural competence and self-awareness, and a good work ethic. The University of Louisiana System has responded to this need and identified five core competencies as critical to the “future of work” and the development of learners. This presentation focuses on embedding soft skills into course syllabi and using Service Learning as a vehicle for soft skill development.

Oral session 3D

## *Assessing Floridian Manatee Body Condition During an Unexpected Mortality Event Using Drone-Based Photogrammetry*

**Alexandra Himel**

Faculty mentor: Dr. Timothy Clay

Evaluating the body condition of wild animals is critical to assess the health of at-risk populations. The Floridian manatee (*Trichechus manatus*) is protected under the Endangered Species and Marine Mammal Protection Acts and face various challenges due to human incidents. This subspecies of the West Indies manatee forms large overwintering aggregations (up to several hundred individuals) in the proximity of sources of hot, fresh water (natural springs, power plants) to maintain body temperature and cope with low water temperatures during Winter. In addition, these animals are affected by seagrass loss that provides their primary food source. In 2020, an Unexpected Mortality Event (UME) was recognized, causing over 637 deaths. In this project, we employed drone-based photogrammetry, an innovative and non-intrusive method, to develop body condition indices (BCIs) to assess the health of a coastal population of overwintering manatees (Cape Canaveral, FL). We estimated the body measurements of 1437 Floridian manatees, using the software Morphometrix. Our results showed that the mean BCIs of overwintering adults were significantly lower than well-fed captive individuals. In addition, a comparison between BCIs from the Cape Canaveral population and a healthy population of wild Floridian manatees overwintering in warmer riverine habitats (Crystal River 2012-218, USGS data) suggests that coastal populations are more vulnerable to harsh winter conditions with significantly lower BCIs than the Crystal River population. Altogether, our results reveal a global decrease in BCI of the Floridian manatee population and call for furthering the health assessment of the at-risk population to develop practical response actions.

Oral session 2C

## *How Machine Learning and Data Science Can Help Local Businesses*

**Saisiddharth Nandhakumar**

Faculty mentor: Dr. En Mao

This is a service-learning project, which started as a result of my summer internship at MyGovernmentOnline, a local Houma software company which provides electronic permit submission and approval for citizens and local governments. Their business spans across the country in eight states including California, Texas, and Louisiana. Since its inception in 2012, it has grown tremendously. They spend a large volume of their resources in customer support. Our purpose is to help MyGovernmentOnline to identify the top challenges their customers are facing and strategies to streamline their operations. We examined 93,967 online customer support tickets from 2014 to 2022. We analyzed the text from the tickets using text mining and machine learning techniques. Specifically, we used Python, Tableau, Microsoft Excel. In addition, we used a topic modeling algorithm that identified and classified customer challenges into 12 main categories including, “how to make credit card payment online” and “How to schedule an inspection.” These valuable insights suggest that MyGovernmentOnline could benefit greatly from creating customer educational content, such as, how to make payments online. We could potentially eliminate 3,198 tickets by addressing just the top two problems, which could save 1055-man hours. The potential business savings are \$10,550. We have also identified some staffing strategies that would improve efficiency. Finally, this

service learning project has helped me learn more about the field of data science more than what I would've learned just from theory.

Oral session 2F

*Developing A Database in Collaboration with BOEM Focusing on Health Correlations with Oil and Gas Waste Facilities in Louisiana*

**Taylor Thibodaux**

Faculty mentor: Dr. Gary LaFleur and Dr. Shana Walton

The Bureau of Ocean and Energy Management has partnered with Nicholls Bayou Studies to create a database regarding coastal communities. Research papers discussing coastal communities will be coded through MAXQDA and uploaded into the database, which will be made public on both the BOEM database and Nicholls home page. This project will contribute literature regarding the waste facility at Grand Bois, Louisiana and three other major oil and gas waste facilities throughout Louisiana. The Louisiana Department of Environmental Quality provides incident reports for each waste facility, in which the total number of reports at each facility was correlated to cancer rates, infant mortality, and life expectancy. It was hypothesized that the sites with higher numbers of incident reports would have higher cancer rates, high infant mortality, and decreased life expectancy. Upon analyzation, there were higher cancer rates in those areas with more reports as well as lowered life expectancy. Infant mortality, however, was higher in the parishes not observed in the study. This is predicted to be a result of other outside factors, such as a bomb testing facility located in the northern parishes, which could be contributing to the higher numbers.

Oral session 2B

## Poster Presentations

*Investigation of Nutrient Loading and Flooding Depth on the Survival and Growth of Bald Cypress (Taxodium distichum (L.) Rich.) and Schoenoplectus californicus (C.A. Mey.) Palla.*

**Maegan LeBlanc**

Faculty mentor: Dr. Jonathan Willis

The assimilation wetland in Thibodaux, Louisiana, is a part of a much larger degraded swamp. The adjacent wastewater treatment plant releases an average of 11,546 m<sup>3</sup> day<sup>-1</sup> of highly nutrient-rich water into the 231-ha, or 570.81 acres of cypress swamp. However, the cypress swamp has experienced substantial degradation, significantly reducing individual trees and tree canopy compared to nearby reference sites. This study is research that focuses on the potential role of flooding and nutrient concentrations that may be limiting the establishment and expansion of crucial wetland species during restoration efforts through a mesocosm and field study. To accomplish this, the mesocosm study, beginning in the fall of 2021 and continuing through the spring of 2022, a two-species (*Taxodium distichum*, *Schoenoplectus californicus*) x 2 flooding depth (5 cm, 40 cm) x 2 nutrient level (ambient, elevated nitrogen) factorial design was implemented. The field study, initiated in early spring 2022, evaluated two species (*Taxodium distichum* and *Schoenoplectus californicus*) at current and artificially elevated soil elevations. Overall, flooding depth at the levels tested appears to represent a significant impediment to vegetation re-establishment. Successful re-vegetation at this site will likely necessitate hydrologic modifications to enhance restoration establishment success.

Poster session 3A

*Developing a Model to Analyze Food Security in Sub-Saharan African Countries*

**Naomi Raeford**

Faculty mentor: Dr. En Mao

Why is China heavily investing in Africa? In 2020, China invested over 43 billion dollars into African development. What makes this market so attractive? Sub-Saharan Africa is currently one of the fastest growing populations in the world. In the western region, the population is said to double with each new generation. However, the countries

within this area are plagued with food insecurity. In this study we're analyzing how food security is defined and investigating how it impacts African citizens. The Food and Agriculture Organization (FAO) of the United Nations interprets food security as an existence where everyone, at all times, has physical and economic access to sufficient, safe and nutritionally appropriate food. At its core, food security can be broken into four categories: Accessibility, Availability, Stability, and Utilization. We will examine each of these categories and their direct influences on the food security of Sub-Saharan countries. Our goal is to develop a model that explores the inter-relationships between macro country-level factors such as agricultural, environmental, and trade variables and food security. We have garnered our datasets from reputable sources, namely, the FAO's official website and the World Bank. In addition, we have utilized programs including Python and Tableau to merge the datasets and develop a series of visualizations to represent some of our key findings. In this poster we aim to make some practical recommendations on how to improve food security in the Sub-Saharan region that would have a positive impact on its people.

Poster session 3A

### *Analysis of Cyanide in Municipal Waste and Drinking Water*

**Tristan Stokes**

Faculty mentor: Dr. Darcey Wayment

Analysis of wastewater is necessary to ensure ecological health. Wastewater is a complex system containing organic and inorganic compounds, dissolved compounds, and insoluble substances. Dissolved compounds include compounds such as sulfates, phosphates, nitrates, and cyanides. These particular anions can have adverse effects on water quality ranging from laxative effects to total respiratory failure. This study employs ion chromatography (IC) with conductivity and electrochemical detection to investigate the concentration of these four anions in local water supplies, including pre-treatment source waters, post-treatment effluents, and approved drinking water following purification. The results of this study will examine the validity of the analytical method and provide a comparison between treated and untreated waters in order to determine local water quality and the effectiveness of current water purification processes with respect to these substances. The secondary goal of this study is to provide awareness of ion chromatography's use in everyday applications and effectiveness in aqueous quantitative analyses.

Poster session 3B