

Graduate Research Conference Schedule

Thursday, November 9, 2023 from 9 am - 5 pm

8:30 am - 4:00 pm - Registration Check In - Registration Desk

9:00 am - 5:00 pm - Faculty Research Displays - Foyer

Graduate Student Research Presentations

10:00 - 10:50 am

Session 1 - Room 214

Jemin Kachhadiya, TSYS School of Computer Science, Columbus State University
Remote Surveillance for Soldier and Civilian Recognition

Abstract for Jemin Kachhadiya

Abstract: This project presents a novel approach to remote surveillance, utilizing the YOLO (You Only Look Once) algorithm for real-time detection and classification of soldiers and civilians in live video feeds. YOLO is a deep learning-based algorithm. The methodology integrates advanced computer vision techniques with the machine learning model, trained to recognize distinctive features for precise classification. Upon detecting a civilian, the system generates and transmits a JSON object to an operational center, enabling quick decision-making. This innovation has the potential to transform remote surveillance in various contexts by automating initial identification, thereby reducing the cognitive load on human operators. Overall, this work offers a robust solution for real-time recognition in dynamic environments, emphasizing the significance of efficient remote surveillance. This system is live at Ft. Benning.

Co-author: Dr. Shamim Khan

Rahul Raj, TSYS School of Computer Science, Columbus State University
Access Control in Blockchain

Abstract for Rahul Raj

Abstract: The term blockchain has become popular ever since cryptocurrencies were introduced. Commonly associated with Bitcoin, it is in fact a technology which is utilized to perform and record transactions. As the name suggests, blockchain is a chain of blocks. This chain of blocks is known as a ledger and lives on all the nodes of the blockchain network. Having copies of the chain on all nodes makes it decentralized and removes a single point of failure. Each block on the chain holds information regarding the transactions that were performed along with the hash value of the previous block. A block is added to the chain via a consensus mechanism and once a block is added to the chain, it cannot be altered or deleted. Modifying an existing block changes its hash value eventually breaking the chain. As such blockchain is tamper-proof providing the much-desired security property of integrity. Smart contracts are pieces of code that can be executed on a blockchain network to perform specific tasks or to implement a certain functionality.

In this study we will explore the use of blockchain technology in access control particularly for Internet of Things (IoT) networks. Even though blockchain provides the security properties of integrity, redundancy, and single point of failure, it does not provide confidentiality of the data. We plan to deploy smart contracts on the Ethereum platform for secure sharing of data from IoT networks among authorized parties. We also plan to use homomorphic encryption, a technique that allows computations to be performed on encrypted data, for sharing the data to protect privacy and provide confidentiality.

11:00 - 11:50 am

Graduate Student Poster Session - Blanchard A

Farima Hajjahmadi, Earth and Space Sciences, Columbus State University
Towards Merging Nonlinear and Learning Control Approaches for Controlling Electro-Hydraulic Servo-Systems

Abstract for Farima Hajjahmadi

Abstract: Enhancing the overall efficiency of Electro-Hydraulic Servo-Systems (EHSS) is of paramount importance due to their diverse applications in advanced industries. In the past, many researchers spent tremendous efforts designing high-performance learning-based and nonlinear control strategies for EHSS. Although these methods have several benefits (e.g., handling uncertainties, unmodeled dynamics, and disturbances), implementing these techniques in real-time remains challenging. In this work, we study the fundamental steps towards designing and implementing a control strategy by merging nonlinear and learning control methodologies or controlling electro-hydraulic servo-systems. We performed numerical simulations to illustrate the significance of the designed control law. This work is in its early stages and will be extended to design a practical learning-based nonlinear controller for EHSS.

Co-author: Dr. Mohammad Jafari

Patrick Haley & Brenna Smith, Teacher Education, Leadership, and Counseling, Columbus State University
Use of Cognitive-Behavioral Therapy (CBT) in the Treatment of Schizophrenia

Abstract for Patrick Haley & Brenna Smith

Abstract: Schizophrenia is a disorder that can affect behavioral, emotional, cognitive, and social functioning of individuals who experience the psychotic symptoms associated with the disorder. The label of being schizophrenic carries a great amount of social stigma that can be internalized by those who have been diagnosed with the disorder. It is a heterogeneous disorder that requires a multi-faceted approach to treatment. This type of approach can reduce symptoms and increase functioning in individuals with schizophrenia. However, the disorder is typically experienced across a lifetime with no guarantee of recovery. The internalized stigmatization as well as the functional decline associated with the disorder hinder the individual's ability, willingness, and motivation to adhere to a treatment plan. Black individuals (2.1%) have a significantly higher lifetime prevalence of schizophrenia than white (1.4%) or Hispanic (.8%) populations. The average age of onset for schizophrenia is the late teens to early 20s for men, and the late 20s to early 30s for women. It is uncommon for children younger than 12 or adults over the age of 40 to be diagnosed with schizophrenia. Males typically experience more negative symptoms, while females more commonly experience affective symptoms. Women typically experience higher remission rates and lower relapse rates compared to men. In terms of disease course, men generally have a worse prognosis than women.

Cognitive-Behavioral Therapy (CBT) is a research and clinically-based counseling theoretical orientation that seeks to help individuals through psychological problems and distress by encouraging and teaching the individual to assess and reframe cognitive and behavioral patterns. It also helps individuals explore and identify better ways to cope with various problems and distress. CBT typically uses a more structured approach to counseling that relies heavily on psychoeducation and a greater emphasis on problems as they are currently presented without as much concern for the past. The goal of this presentation is to provide research and compile evidence-supported resources that demonstrate ways in which counseling using CBT as a theoretical orientation can assist those who have been diagnosed with schizophrenia, such as increasing functioning, decreasing negative symptoms, reducing internalized stigma, and increasing coping ability in individuals with schizophrenia. Different types of interventions that fall underneath the CBT framework will be explored, including the goals, methods, and expected outcome of each intervention. Cultural considerations related to schizophrenia and CBT as well as limitations to the theoretical orientation and interventions will also be presented.

Carly Perez & Ja'Lisa Adams, Teacher Education, Leadership, and Counseling, Columbus State University
The Use of CBT in the treatment of Depersonalization/Derealization Disorder

Abstract for Carly Perez & Ja'Lisa Adams

Abstract: The goal of this meta-analysis is to assess the current literature of the mental disorder that the American Psychiatric Association (APA) identifies in The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR) as Depersonalization/Derealization Disorder (DDD). This meta-analysis was conducted to empirically look at the current state of evidenced-based treatment modalities available for Clinical Mental Health Counselors and others in the field of counseling to utilize in the treatment of those with DDD. This disorder falls under the Dissociative Disorders category of the DSM-5-TR. Depersonalization (DP) can be described as feeling detached from one's mind or body. Many people feel as if they are watching events happen to them outside of their body. Derealization (DR) can be best described as feeling detached from reality and one's surroundings. Many individuals describe feeling as if the world around them is not real. The experiences of emotional and physical numbing of those with DDD can pose a hindrance to the development and continuation of personal relationships, and this can cause occupational distress. DDD has an estimated prevalence from community samples across diverse cultural settings show a rate of 1-2% and this rate does not propose a prevalent gender experiencing more diagnoses of DDD than the other. Despite the prevalence of DDD, there is a lack of clear treatments in place for professional counselors to employ in helping those with DDD compared to that of other more prevalent mental disorders. Over this meta-analysis, theoretical and empirical literature from the last twenty years was reviewed. The existing research indicates that Cognitive Behavioral Therapy (CBT) has been and continues to be considered the most effective treatment modality for DDD. This review is intended to synthesize the literature in such a way as to bring attention to the disparities in treatment, research, and knowledge for those impacted by DDD.

Bettina Thornton & Adil Zaman, Teacher Education, Leadership, and Counseling, Columbus State University
Bridging Diagnosis and Wellness: A counseling perspective on CBT for Military/Veteran clients with PTSD

Abstract for Bettina Thornton & Adil Zaman

Abstract: Military personnel and veterans are among the populations who are impacted the most by post-traumatic stress disorder (PTSD). This poster presentation will explore post-traumatic stress disorder as a diagnosis through the lens of professional counseling and utilizing a cognitive behavioral therapy (CBT) approach. While PTSD has established diagnostic criteria that are used by many helping professionals, counselors take a wellness approach to clients which impacts how theoretical approaches and treatments are applied. The specific types of traumas that military personnel and veterans undergo, and their resources for treatment, further narrow treatment recommendations. In this presentation, the researchers will help the reader understand what PTSD is by defining the diagnosis along with its symptoms. Furthermore, the reader will have an understanding of how a counselor uses the diagnostic criteria of PTSD to diagnose the client. When the average person hears the word "culture," they often assume the term is referring to a certain race and the lifestyle associated with that race. The average person may not realize that military personnel and veterans have their own culture within their groups and workspaces. This presentation will educate the reader about the culture of military personnel and veterans and how that culture will be considered throughout this theoretical approach. Along with the hurdles of cultural barriers, there are several other limitations that come with cognitive behavioral therapy. This presentation will provide a balanced approach to helping military personnel and veterans with PTSD in which both the benefits and challenges of CBT will be explored. Through scholarly research, cognitive behavioral therapy will be examined for its efficacy in treating military personnel and veterans with post-traumatic stress disorder. Furthermore, the interventions suggested for the diagnosis will align with the goals and methods that the counseling profession hopes to offer to PTSD clients. The poster presentation will include examples and brief case studies that illustrate CBT approaches to PTSD in this population.

Co-author: April Wolf

1:00 - 1:50 pm

Session 2 - Room 214

LaCresha Cunningham, Whitney M. Young Jr. School of Social Work, Clark Atlanta University
The Family We Choose: Doulas as Extended Family Members

Abstract for LaCresha Cunningham

Abstract: Historically, the African American extended family has been a major source of social and emotional support for young families. Infant and childcare, along with general childrearing, has been a substantial benefit of living near extended families. Additionally, extended family has often been a source of respite during illness, pregnancy, childbirth or traumatic life events; stepping in to provide care, support and assistance as needed. However, the rise of single parenting, job relocation, significant loss of family members due to the Covid19 Pandemic, and reversal of Black migration patterns has left a gap in social support for mothers and fathers. Birth and postpartum doulas are well positioned to fill this deficit by acting as extended family members in the absence of kinship networks.

Doulas are trained paraprofessionals that aid in the fertility journey, antepartum period, labor and delivery and/or postpartum. Fertility doulas assume the role as emotional support for those who have special needs requiring external assistance during the conception period. Full-spectrum, birth, and postpartum doulas assume the role as an educator and advocate during antepartum, active labor and postpartum activities for expectant and perinatal mothers. Doulas now provide services outside their conventional roles such as baby-sitting their clients existing children during labor, meal preparation, laundry, light cleaning, and overnight newborn care; activities that were traditionally carried out by close female family members. Doulas also serve as a sounding board and emotional support for mental stability during pregnancy, often acting as a liaison between the birthing mother and mental health provider.

This study explores the role of doulas and their role as extended family in limited kinship systems. Furthermore, this study takes a deeper look at the duration of doula/client relationships which extend beyond the traditional contracted term for service. We use the qualitative method of group storytelling and narrative analysis of mothers who have used doulas in this capacity to gain perspective on how the use of doulas have provided them with familial-oriented social and emotional support. Through a narrative analysis, participants are able to offer transparent recollections of their lived experience, and a personal account detailing the reasons they chose their doula, and the doula's impact on their familial unit.

Co-Author: Kristie Lipford Wyatt, PhD

Clara Farnsworth, Sociology and Human Services, University of North Georgia
Food Sovereignty in Navajo Nation: Adaptability and Resilience from Pre-Colonization until Today

Abstract for Clara Farnsworth

Abstract: Food sovereignty is the right to healthy, sustainable, and accessible food. It has emerged as a critical issue amid the growing cost of living crises. This study examines how colonization eroded food sovereignty among the Navajo Nation. It argues that Navajo women adapted traditional food practices to provide for their nation during their forced removal. Their resilience and determination sustained both the bodies and minds of Navajo nation; their voices are essential to help solve the issues surrounding food sovereignty. Since their creation, the Navajo people have entrusted the responsibilities of planting, feeding, educating, and nurturing to women. They kept the villages healthy and thriving and when the colonizers threatened their livelihood, they adapted their practices to keep their people alive. The colonizer's values were in direct contrast to those of Navajo nation. They aimed to use Navajo land for profit which led to overplanting. This dehydrated the soil, making agriculture nearly impossible. Centuries of tension between these two groups culminated during The Long Walk of 1864, which took the Navajo people four hundred miles away from their ancestral homeland. The Navajo people spent the next four years being starved, executed, beaten, and raped as American soldiers, under orders from the United States Government, tried to eradicate and assimilate them. Instead of succumbing to this intense pressure, Navajo women stepped up, creating new recipes from the meager rations provided to them. Although these rations were high in sugar and carbohydrates, they were calorically dense and filling. The women sustained the whole nation and created dishes that are now considered historical dishes which connect modern day members of Navajo nation to their brave ancestors. According to traditional Navajo belief, Hunger is not just a state; it is a living being that threatens survival. The American colonizers became this monster by removing the Navajo people from their land, destroying their soil, and forcing them to cook with spoiled meat, inedible food, sugar, and flour. The forced integration of these ingredients has resulted in the epidemics of diabetes and obesity on reservations. The federal government has a responsibility to better serve the Navajo nation and center them in the discussion of food sovereignty to allow them to decide how they want to combine traditional and modern-day practices as they move into the future.

2:00 - 2:50 pm**Session 3 - Room 214**

Morgan Fleming, Turner College of Business, Columbus State University
Gender, Humor, and Servant Leadership: Variables Influencing Affective Commitment

Abstract for Morgan Fleming

Abstract: There is a vast body of evidence linking both servant leadership and leader's use of humor to positive organizational outcomes. However, research on the role that humor plays while practicing servant leadership is an area yet to be thoroughly studied. *Gender, Humor, and Servant Leadership: Variables Influencing Affective Commitment*, reviews the current research on humor's role in leadership, servant leadership's correlation to increased affective commitment, and gender as a moderator in leaders' produced effects while using humor. This conceptual piece proposes a hypothesis that there is a statistically significant difference in the success to which servant leaders can use humor to influence affective commitment based on their gender, stemming from relevant empirical findings and anecdotal evidence from organizations with both male and female leaders.

Furthermore, this research adds to the body of literature that explores the predisposition of certain individuals to become servant leaders and if the style is learned or innate. It also speaks to the field of study discussing the process of servant leadership and the "how" and "why" questions of servant leadership's success.

Helle Friis, TSYS School of Computer Science, Columbus State University
Analyzing what entrepreneurs actually do using artificial intelligence

Abstract for Helle Friis

Abstract: The literature on entrepreneurs describes individuals and the activities they perform in the creation of new businesses. Historically, the literature has extolled the virtues of writing a business plan. The leading textbooks all have sections on writing a business plan. However, recent observations and academic studies suggest that entrepreneurs do not actually do all of the things previously linked to them.

In this project, we use artificial intelligence to evaluate the written feedback from 100 entrepreneurs based upon interviews, to analyze the following three research questions: What factors or people influenced the decision to start a new business?, which lessons did entrepreneurs learned from starting a new business? and which factors impacted growth and survival of the business?

This study is aiming to provide empirical evidence that fills in the gap in our understanding of what entrepreneurs actually do prior to starting and once they have their business in operation. At the core of this project is the creation of a machine-learning model to conduct content analysis. The project will use natural language processing to process the large amount of written feedback from the entrepreneurs. By using natural language processing, we can make and use computer models to extract the meaning from this unstructured and to some degree open-ended text, for example through summarization and finding patterns. We can cluster similar elements together based on the content to give a high-level overview of the information gathered from the written feedback.

An interesting algorithm to use in natural language processing is topic modeling, by using contextual analysis on the text we can determine topics which are common and potentially combine with data labeling the different element of the written feedback in order to identify the factors and lessons from our research questions and their importance to what an entrepreneur do. Thereby we would be able to use machine learning to answer the three research questions.

Co-author: Walker Smith

3:00 - 3:50 pm**Session 4 - Room 214**

Alisha Kennedy, Biology, Columbus State University

Biological Activity of Novel Azolium-Based Therapeutics against TDP-43-Mediated-Toxicity in Transfected Normal Neuronal and Carcinoma Cell Lines

Abstract for Alisha Kennedy

Abstract: Amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease, is a progressive neurodegenerative disease that damages motor neurons that run from the brain into muscles via the spinal cord. These neurons are what control voluntary muscle movements, such as the ability to eat, speak, and breathe. When damaged, these neurons no longer provide the ability for voluntary movement and are ultimately fatal. Despite the variation in the mean survival time for ALS patients, the average unfortunately is low, ranging from a few months to up to 10 years. A hallmark feature in ALS and other neurodegenerative diseases is the presence and overexpression of the TDP-43 protein. Through mutations on the C9orf72 gene, this protein is continuously expressed and aggregates, becoming cytotoxic and killing neurons, which ultimately drives neurodegenerative diseases. Knowing that the TDP-43 protein is a signature feature in neurodegenerative disease, specifically frontotemporal dementia (FTD) and ALS, allows it to be a promising target for exploring new therapeutic interventions to try to minimize or completely halt the progression of such diseases. ALS currently does not have a cure, but there are treatment options to help manage the symptoms of the disease. The most commonly prescribed treatment option, Riluzole, is one of two FDA-approved oral drugs for ALS. Riluzole is a drug in the benzothiazole family that works to block the release of glutamate. However, Riluzole and other ALS treatments on the market fail to meaningfully extend the lives of ALS patients and effectively manage patients' symptoms to increase their quality of life. Additionally, it is uncertain where drugs target and inhibit aggregation of the TDP-43 protein and if they do so with specificity to not affect normal, healthy cells. We have synthesized, characterized, and tested the biological activity of a series of novel azolium-based salts (benzothiazole and triazole, designated BS and T3, respectively) against WI-38 and H1299 cells. This project will explore the effects of these novel salts against TDP-43 transfected HEK cells and SH-SY5Y cells through the analysis of cellular metabolism on increasing levels of TDP-43 mediated toxicity and its alterations of the cell cycle.

Co-Authors: Dr. Monica Frazier, Dr. Kerri Taylor, Dr. Alexandra Tarabolletti

Kyla Sumter, Biomedical Sciences, University of Georgia

Advancing Health Equity: Promotion of Racial and Ethnic Minorities in Clinical Trials

Abstract for Kyla Sumter

Abstract: Clinical trials and other real-world studies establish the effectiveness and safety of various medical products. Furthermore, evidence generation increases appointments and adherence to related activities, improves future treatment opportunities, and offers access to innovative disease treatment options (National Institute on Aging [NIA], 2017, para. 2). Under enrollment of historically underrepresented groups, such as racial and ethnic minorities, undermines research generalizability and findings, further widening the disparities associated with high-quality healthcare access (Hamel et al., 2016, para. 1; National Academies of Sciences, Engineering, and Medicine [NASM], 2022, p. 24-30). This literature review addresses the barriers and impacts associated with under enrollment of racial and ethnic minorities in clinical trials and offers solutions to bolster involvement.

4:00 - 4:50 pm

Session 5 - Room 214

Cason Roberson, Biology, Columbus State University

Exploring Novel Splice Variants of chico in Drosophila: Annotation and Phylogenetic Analysis

Abstract for Cason Roberson

Abstract: Genes involved in critical biological pathways like the insulin signaling pathway are highly conserved across multiple species, and this makes any potential evolution of these genes inherently interesting. The insulin pathway is linked to many human diseases and these symptoms, much like the genes involved, are conserved across species. Specifically, there is a high similarity between symptoms of disease related to the insulin signaling pathway in both

humans and insects such as *Drosophila melanogaster*. Additionally, there is a high similarity between humans and *D. melanogaster* in pathway proteins such as the insulin receptor substrate (IRS) proteins and chico. The chico gene undergoes alternative splicing, which is a mechanism of producing multiple RNA isoforms from one genomic DNA sequence. Alternative splicing occurs in both humans and *D. melanogaster*, with both species expressing high levels of alternative splicing across their genomes. A novel splice variant of the chico gene has been identified in *Drosophila mojavensis* which is highly significant as chico is typically highly conserved across the genus, *Drosophila*. The novel variant noted in *Drosophila mojavensis* led to the development of the following questions:

1. How often and where has the splice variant of the 6th and 7th exon arisen in the evolution of the *Drosophila* genus?
2. What are the evolutionary paths leading to the novel intron-exon borders in the *Drosophila* genus?

Unique approaches are required to address each of the questions. Question one's approach was to use the UCSC Genome Browser to perform an analysis of 35 species at the target splice site in the gene-of-interest to determine how many species in *Drosophila* display novel splice sites of the 6th and 7th exon of chico. There were six species found to exhibit a novel splice site with three of the six species exhibiting a different innovation than that first noted in *Drosophila mojavensis*. The strategy to address question two will require the use of a phylogeny-aware alignment software. This phylogeny-aware alignment program will align the sequences of the novel splice sites in the target species with closely related species and an outlier species in order to determine the likely ancestral sequences and the evolutionary path taken in order to produce the novel splice site(s).

Md. Nurullah, TSYS School of Computer Science, Columbus State University
The application of deep learning to diagnose plant diseases

Abstract for Md. Nurullah

Abstract: Diagnosing plant diseases plays a critical role in promoting sustainable agriculture and ensuring food security. Early and frequent disease detection is of utmost importance in this context. Traditional approaches for identifying plant diseases rely on human experts visually inspecting and analyzing leaf symptoms, a process that is both time-consuming and prone to errors. Delayed disease detection can result in significant harm for individual farmers or even catastrophic consequences for entire forests. In recent years, deep learning techniques, particularly Convolutional Neural Networks (CNNs), have demonstrated remarkable potential in tasks such as plant disease identification through image recognition. This study introduces a CNN-based methodology for the detection and classification of diseased plant leaves compared to healthy ones. In the course of our experiments, we developed two distinct models: a Binary classification model and a Multiclassification model. The Binary classification model effectively distinguishes between diseased and healthy plant images, while the Multiclassification model not only identifies diseased images but also provides the name of the disease along with its probability. For our research, we sourced our dataset from Kaggle, a publicly available platform, as collecting data directly from trees and diseases in the field is a time-intensive endeavor. This dataset comprises 4,236 images, with 2,107 representing diseased plants and 2,129 representing healthy ones. To manage this substantial dataset, we employed the TensorFlow dataset API, which allows us to process datasets that may not fit entirely in memory. The API operates on the concepts of Datasets and Iterators. Our training data consisted of 70% of the total dataset, while the remaining 30% was allocated to validation, ensuring an impartial evaluation of our model's performance during hyperparameter tuning. Our model incorporates various layers, including Flatten Layer, Max-Pooling Layer, Dropout Layer, and Dense Layer. In the course of our experiments, we tested different optimizers such as Adam, SGD, and Adamax, and we varied the number of training epochs between 15, 20, 25, and 30. The Binary classification model achieved an accuracy exceeding 85%, showcasing the potential of deep learning for diagnosing diseased plants. The Multiclassification model, while achieving slightly lower accuracy, proved its capacity to handle large volumes of data and provide disease identifications. Currently, we are working on elevating the accuracy further by developing a hybrid model. This hybrid model will involve training the neural network using genetic algorithms, aiming for even more precise predictions in plant disease diagnosis.

Co-author: Dr. Rania Hodhod