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Schedule

Location: AS-　-A

: am–: am		Breakfast and coffee served in University Dining Room
: am–: am		Welcome: Dr. Brittany Stephenson
: am–: am		Opening remarks: Dr. Christopher Sindt
: am–: am	Session	Kiersten Smith: *Exploring the Role of Reactive Oxygen Species on Alzheimer's Disease Pathogenesis* Raven Robinson: *Navigating Service Provision and Community Perceptions in a Suburban Environment: A Study of Homeless Service Nonprofits* Philie Tebalan: *Graph Theoretical Modeling of Self-Assembling DNA of the Fan Graph Family* Claire Griffin: *Aligning Crime Metrics with Public Perception: A Data-Driven Approach* Audrey Ang: *The Utilization of*

Session

Exploring the Role of Reactive Oxygen Species on Alzheimer's Disease Pathogenesis

Kiersten Smith
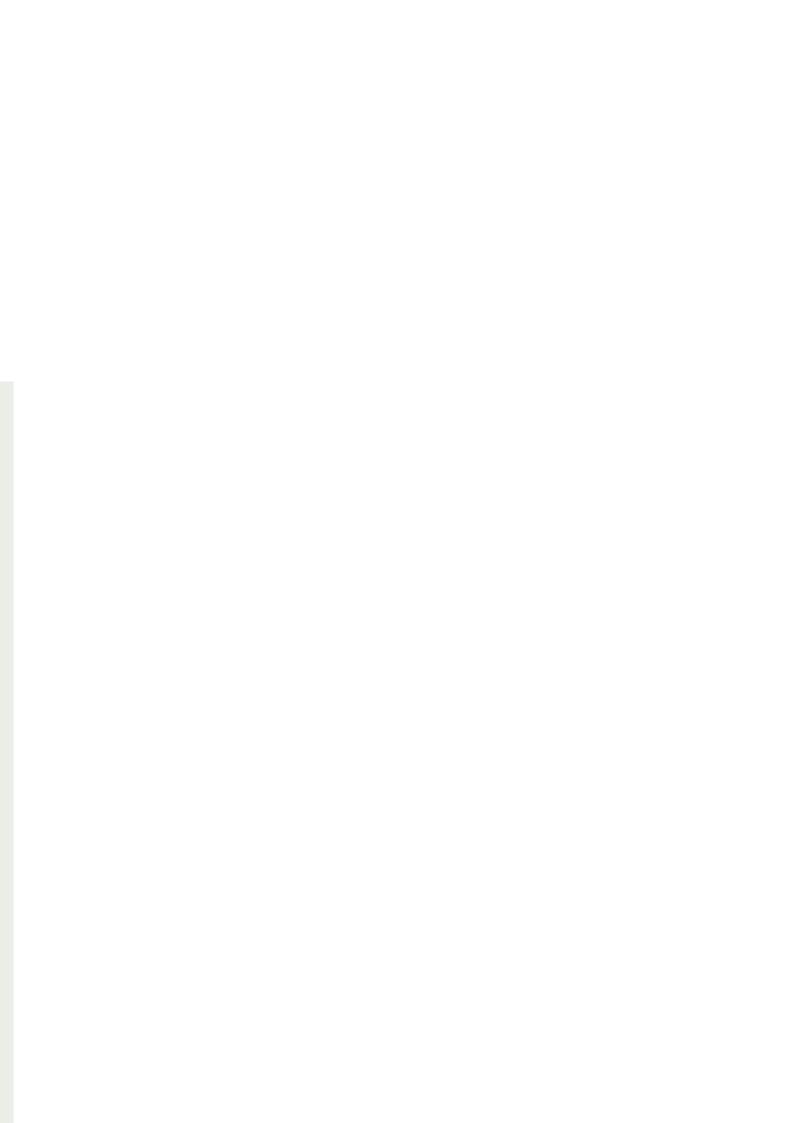
Mentor: Dr. Daniel Kissel

Alzheimer's disease (AD) is the leading cause of dementia globally and is characterized by the formation of amyloid-beta plaques on the brain. Amyloid-beta is a subunit of amyloid precursor protein (APP) and has chemistries that lend themselves to sticky qualities. As these proteins aggregate and stick to one another, plaques form thus resulting in neuronal death. It is not understood what causes APP to separate into its subunits, leading to poor and inadequate treatment for patients with AD. Many causes are being explored looking at both genetic and environmental factors. Reactive oxygen species (ROS) are a potential environmental cause into the formation of amyloid-beta plaque. ROS are a natural byproduct of many cellular processes, especially those related to metabolism. When ROS accumulate, they can lead to the death of healthy tissues, exacerbating the neuronal death associated with plaque development. Metals in the body, such as copper, can help regulate the interactions between ROS and amyloid-beta. Research has suggested that copper can form a coordination complex with beta alanine that improved the lifespan and lowered the presence of ROS in a *Caenorhabditis elegans* model of AD. The potential for this complex to be used as a treatment for humans is currently being explored.

Navigating Service Provision and Community Perceptions in a Suburban Environment: A Study of Homeless Service Nonprofits

Raven Robinson

Mentor: Dr. Rachel Wells

Nonprofit organizations are responsible for providing the majority of services to individuals experiencing homelessness. Despite an increase in suburban poverty in this nation, much of previous research examines homeless service provision in urban areas. Suburban nonprofits may face different political and social environments, such as a greater reluctance to see homelessness as a problem in their community and limited public transportation. This qualitative case study examines the role of homeless service nonprofits in four suburban counties in two Midwestern states, Illinois and Missouri, providing an opportunity to identify variation both within and between states. We are conducting semi-structured interviews about how nonprofit directors and managers understand homelessness, including causes and solutions to homelessness, how these views of homelessness affect their services, and how nonprofits sustain support within a suburban community. This summer, we conducted interviews with nonprofit directors or high-level managers in different cities and two different counties within Illinois. We are moving into data analysis with transcription and emerging themes, ranging from the views of homelessness to partnerships, which will be examined more in the fall. This summer's analysis focused on two themes, barriers to services and challenges for clients. Our data suggests that elements such as strict HUD guidelines and lack of collaboration can create barriers to nonprofit service provision. Additionally, elements such as economic issues and prejudice can create challenges for clients experiencing homelessness.

The Utilization of Whole Cell Catalysis for Dye Degradation
Audrey Ang
Mentor: Dr. Kari Stone

The remediation of azo dye effluent from the textile industry has become a significant environmental concern due to its toxic and carcinogenic properties. Our remediation strategy employs biocatalysis, an eco-friendly technique to degrade azo dyes, which are otherwise resistant to degradation, to non-toxic components. The use of *Caldariomyces fumago* via whole-cell catalysis for the oxidation of azo dyes presents a sustainable method that mitigates the adverse effects of these pollutants. The fungus *C. fumago* secretes a specialized enzyme, chloroperoxidase, which catalyzes oxidation and halogenation reactions. The stability of *C. fumago* is enhanced through encapsulation in calcium alginate beads, allowing these beads to be employed in various applications, such as flow cells or biosensors. Furthermore, encapsulating both the mycelia and spores in media solutions facilitate rapid fungal growth that prompts excretion of chloroperoxidase into the bead matrix, rapidly establishing a functional biocatalytic system for azo dye degradation. Overall, the combination of whole-cell catalysis and alginate bead encapsulation maximizes the potential of the enzyme chloroperoxidase. The findings of this study demonstrate the efficacy of this biocatalytic system in successfully degrading azo dyes.

Session

Deep Learning for Software Testing
Ahmad Yousuf
Mentor: Dr. Al-Sharif

Software testing is crucial for ensuring the reliability and quality of software, but it often involves high costs and time commitments, particularly in regression testing. This research project aimed to address these challenges by leveraging deep learning to optimize test suites, specifically targeting the identification and elimination of redundant test cases. The primary goal was to enhance testing efficiency without compromising test quality. We attempted an approach that involved analyzing execution traces and constructing call graphs to calculate similarity scores between test cases using deep learning models. These scores were used to rank test cases by priority, which would enable test engineers to focus on the most critical and diverse cases to maximize code coverage. The objectives of the project included creating a comprehensive dataset of call graphs, developing methods to identify similarities among test cases, and establishing a framework to prioritize and remove redundant cases. The desired results included a robust framework capable of identifying and ranking test cases based on their similarity measures, which aimed to streamline the testing process and improve overall efficiency. The methodology integrated execution trace analysis, call graph construction, and deep learning techniques to achieve these goals.

An Agent-Based Model for the Evaluation of Precision Nutrition Through a Socioeconomic Lens

Chuckie Gentile
Mentor: Dr. Brittany Stephenson

An individual's overall health is dependent upon many characteristics including age, demographics, physical activity, body-mass index (BMI), underlying health conditions, and socioeconomic status. To date, many guidelines to promote healthier eating have targeted the total population rather than focusing on the individual level. This project investigates the impact of an individual's socioeconomic status on both their overall health and the total population's health through an agent-based model (ABM) of Broadview, IL. Our ABM tracks individual characteristics, decision-making, and daily behaviors to determine an overall health score for each individual. The demographic breakdov ah   (bot

Using Splice Switching Antisense Oligonucleotides to Treat Machado Joseph Disease

Aleksandra Borek

Mentor: Dr. Mallory Havens

Parental Perceptions on Safe Storage Education in Illinois

Julianna Henrichs
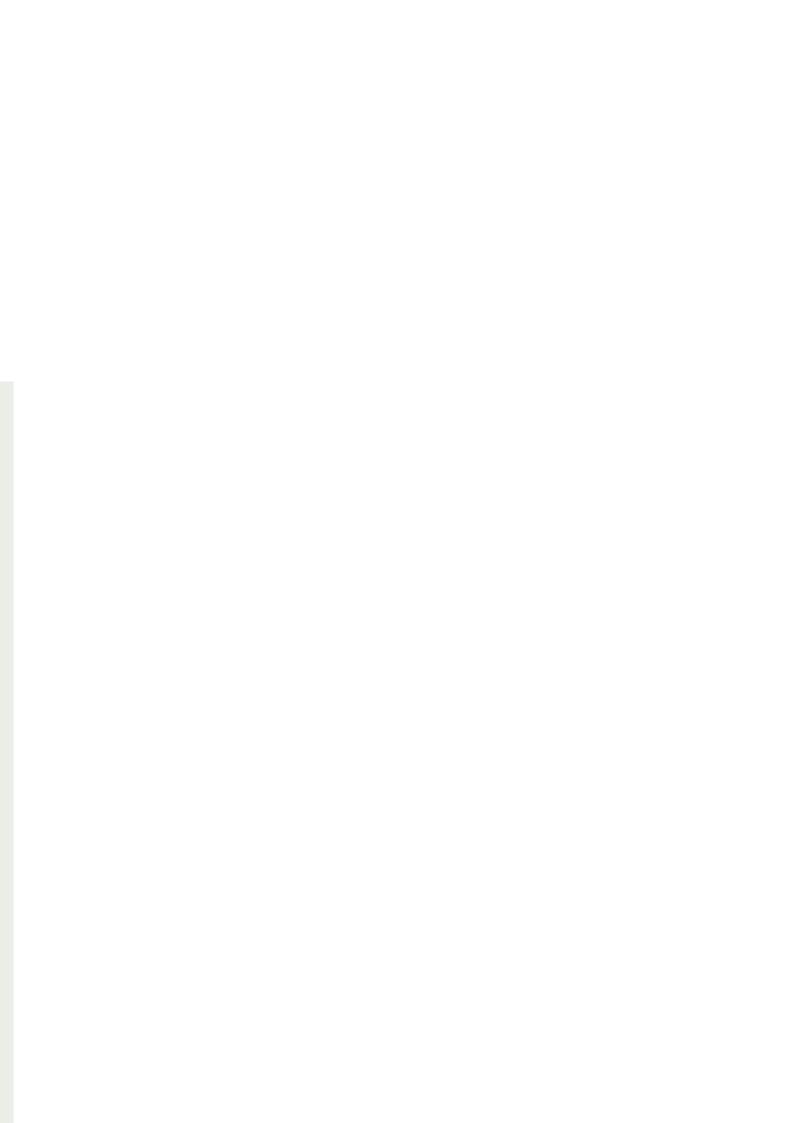
Mentor: Dr. Hannah Klein

In   , rearms became the number one cause of death for children ages -   in Illinois and across the United States. These deaths are not just from upticks in   rearm violence and homicide, but can also be attributed to suicide, unintentional, and accidental deaths. Many deaths could be prevented if rearms are properly stored and kept away from children. There is currently no mandated safe

Comparison of the Chemical and Physical Properties of Biochar Produced from Different Invasive Plants

Angelina Martinez

Mentor: Dr. Jason Keleher

Climate change has devastating impacts on the environment. When coupled with unsustainable farming practices, agricultural soils are degraded. Degraded soils may be compacted, polluted with agrochemicals, desertified, and susceptible to erosion. In its degraded state, the soil can lack essential nutrients and fail to provide important ecosystem services. Biochar has been applied as an amendment to degraded soils. This research examined the chemical and physical properties of biochar produced from three different invasive plants. The leaf properties of each plant species are different, so in turn the biochar will have different properties, which may influence plant growth. Biochar and biochar-soil mixtures were analyzed using spectroscopy techniques, including

Incorporating Social Determinants of Health into Physical Therapy Curricula: A Scoping Review

Ariana Estrada

Mentors: Dr. Arvie Vitente, Dr. Carmina (Minnie) Rafael, Dr. Mark Apostol, and Dr. Adrian Suratos

Purpose/Hypothesis: This scoping review aims to investigate the integration of social determinants of health (SDOH) into Physical Therapy curricula. The hypothesis posits that while the signi cance of SDOH is acknowledged in healthcare, their incorporation into physical therapy education is currently limited. Number of Subjects: A comprehensive search identi ed thirteen ( ) articles, with only one meeting the inclusion criteria for detailed analysis.

Materials/Methods: A thorough literature search was conducted across databases such as PubMed, CINAHL, and ERIC using keywords including "social determinants of health," "physical therapy," "curriculum," "education," "integration," and "teaching methods." Boolean operators (AND, OR, NOT) re ned the search, exempli ed by the string ("social determinants of health" OR "SDOH") AND ("physical therapy" OR "physiotherapy") AND ("education" OR "curriculum" OR "teaching methods"). The search followed PRISMA-ScR guidelines for systematic identi cation and inclusion of relevant studies. Screening was based on prede ned inclusion criteria: relevance to physical therapy education, focus on SDOH, and publication in peer-reviewed journals. The nal selection involved a detailed analysis of the chosen articles to evaluate the extent and methods of SDOH integration into physical therapy programs. The comprehensive report preparation adhered to PRISMA-ScR

Nursing Faculty Views on Holistic Admissions Review

Saja Ahmed

Mentors: Dr. Tina Bobo, Dr. Daisy Sherry, and Dr. Linda Ste ens

Background: The federal government projects that racial and ethnic minorities will account for percent of the United States population by (Vespa, et.al., ( ). As the population becomes more diverse, cultural competence in healthcare professionals become essential to meet complex healthcare needs. In spite of improvements in overall health, racial, ethnic, and other underserved communities continue to face health disparities.

Purpose: Implementing Holistic Admissions Review (HAR) is a key strategy that nursing programs can utilize to increase student diversity. This process involves adapting admissions practices to view the students as whole people and not just academic metrics. Diversifying the nursing workforce will provide compelling bene ts for healthcare systems – especially in medically under-served communities. Faculty awareness and agreement with HAR is an important factor in the success of implementing a holistic admission process, but little is known about faculty opinions regarding HAR in terms of research ndings. This gap in the literature is what this study proposes to address.

Methods: The study was conducted anonymously via a -question Qualtrics survey link sent via email to nurse educators with an invitation to participate. Phase One of the study was a pilot conducted at Lewis University over two weeks in April . The survey included declarative statements drawn from the AACN informational and training materials on nursing school admission to which participants are asked to estimate their level of agreement/disagreement. Phase Two of the study was conducted in September among a national sample of nurse pre-licensure nursing educators in the US. The invitation was sent to , plus faculty emails.

Results: A total of survey responses were received. In this study, % of respondents agree with HAR as a strategy to diversify the nursing workforce and address health inequities. Eighty-seven percent of respondents disagree that retention, graduation rates, and NCLEX pass rates su er when diverse students are enrolled in nursing programs. Respondents were evenly split on their views on the use of metric-based admission standards as the best way to ensure quali ed applicants to

SURE Students

Aaron Allred	Biology

Health Research Services Administration (HRSA) Grant Students and Faculty Mentors

Saja Ahmed	Nursing Student
Ariana Estrada	Nursing Student
Tina Bobo	Assistant Professor of Nursing and HRSA NWD Grant Coordinator
Arvie Vitente	Professor, Doctor of Physical Therapy Program (Albuquerque Campus)
Daisy Sherry	Associate Professor and Associate Dean of the College of Nursing & Health Sciences
Linda Ste ens	Retired Nursing Faculty
Carmina (Minnie) Rafael	Instructor, Doctor of Physical Therapy Program (St. Augustine-Miami)
Mark Apostol	Assistant Professor, Doctor of Physical Therapy Program (Touro University-NY)
Adrian Suratos	Assistant Professor, Doctor of Physical Therapy Program (Touro University-NV)

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