# STUDENT RESEARCH SYMPOSIUM

## A CELEBRATION OF MENTORED STUDENT RESEARCH

**WEDNESDAY, APRIL 22, 2026**

Fairfield University

# SESSION I

## Egan School of Nursing and Health Studies Capstone Projects

- Nursing Capstone Projects
- Public Health Capstone Projects
- Graduate Student Projects

STUDENT RESEARCH SYMPOSIUM

# Improving Safety and Communication in Geriatric Long-Term Care (LTC) to Emergency Department (ED) Transitions: A Standardized Nursing Checklist for Quality Improvement

**Bridget Belfiore**

Faculty Mentor: Katherine H Saracino DNP RN CWON

Egan School of Nursing and Health Studies

Booth: 1

**Abstract:**
Geriatric patients transferred from long-term care (LTC) facilities to the emergency department (ED) frequently present with incomplete and inconsistent medical records, which pose significant risks to their care, well-being, and overall safety. Incomplete documentation, such as medication regimens, baseline cognitive status, and code status, increases the risk of delayed treatment, medication errors, and adverse outcomes. This concern was identified during clinical experience in the ED, where information gaps during patient transfer impacted the delivery of safe and effective care. The literature indicates that communication gaps and fragmented documentation regularly occur during LTC-to-ED transitions. To respond to this situation, a standardized checklist was developed to assess whether critical health information was documented during ED admission. This tool can be utilized within quality improvement processes to identify recurring documentation gaps, enhance communication, and promote safer, more integrated patient care.

# Enhancing Patient Safety  Through Gait Belt Adherence  In the Medical Surgical Unit

**Lauren Pavarini**

Faculty Mentor: Katherine H Saracino DNP RN CWON, Jessica Marraffa MSN, RN

Egan School of Nursing and Health Studies

Booth: 2

**Abstract:**
Hospital falls impact patient safety, hospital costs, and quality ratings. National benchmarks show an average fall rate of 3.44 per 1,000 patient days, with 25% resulting in injury. Fall-related injuries cost over $7,000 per incident, and hospitals are not reimbursed for these events (AHRQ, 2024). Assisted falls are associated with a lower risk of injury, particularly when proper safety equipment, such as gait belts, is used. However, adherence to gait belt use remains inconsistent. This project addresses this gap by providing visual reminders and targeted staff education to promote consistent use of gait belts during patient transfers and ambulation. The goal is to reduce fall-related injuries, enhance patient safety, and decrease associated healthcare costs.

# Benefits of Portfolio Diet to Reduce LDL-C Levels and Prevent CVD Events

**Mohigul Rabbimova**

Faculty Mentor: Katherine H Saracino DNP RN CWON, Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 3

**Abstract:**
The Portfolio diet emphasizes four FDA-approved cholesterol-lowering food groups: nuts, plant proteins, viscous fibers, and plant sterols. Clinical studies demonstrate significant reductions in LDL-C, triglycerides, non-HDL cholesterol, and C-reactive protein (CRP), along with modest improvements in blood pressure. The implementation of the Portfolio diet has been explored as an effective approach to lowering cholesterol levels and reducing cardiovascular disease risk. This project seeks to educate patients at high risk for cardiovascular disease (CVD) on the effectiveness of the Portfolio diet in reducing LDL-C. A handout was developed and will be used to educate patients in the stroke unit with a history of hyperlipidemia.

# Soothing for Safety:  Enhancing Newborn Safe Sleep Education on Pacifier Use to Reduce SIDS Risk

**Krista Schultz**

Faculty Mentor: Kathryn Manfredo

Egan School of Nursing and Health Studies

Booth: 4

**Abstract:**
At a 305-bed acute care hospital serving a diverse suburban population, safe sleep education is routinely provided to new mothers, including recommendations for pacifier use to reduce the risk of sudden infant death syndrome (SIDS). While this guidance is included, limited explanation of the rationale behind pacifier use may impact parental understanding and use. This project was developed after observing this gap during clinical practice and aims to enhance discharge education through the creation of an evidence-based pamphlet. The pamphlet provides clear explanations, addresses common misconceptions, and reinforces current safe sleep recommendations. This intervention has the potential to improve parental knowledge, support informed decision making, and promote consistent safe sleep practices, ultimately contributing to improved infant safety outcomes.

# Promoting Community Activism Through Art

**Alana Planas**

Faculty Mentor: Dr. Bridget Hussain

Egan School of Nursing and Health Studies

Booth: 5

*This research was also presented at the Society for Public Health Education 2026 Annual Conference*

*This research was supported by the McGuinness Fund*

**Abstract:**
Food insecurity is often overlooked on college campuses, particularly within institutions with a majority of undergraduate students from families with high socioeconomic backgrounds. Despite this perception, many students experience barriers to accessing adequate food due to a variety of factors independent from socioeconomic background. This is often compounded by stigma and lack of awareness of available resources. Traditional approaches to addressing food insecurity may fail to engage students if programs do not account for these psychosocial barriers. The "Snacks without Stigma" project explores how student-faculty collaboration and community partnerships can be used to reduce stigma and increase engagement through arts-based activism. As a student research assistant for the Undergraduate Nutrition, Disordered Eating Relationships, Food-based Economic Decisions (UNDERFED) project, our team worked together to design and implement a series of outreach initiatives aimed at bringing attention to the hidden issues of student food insecurity. These initiatives included a speed-networking event connecting students with community advocates and food justice leaders, a Lunch & Learn at Fairfield University's Bridgeport campus, and an interactive performance of Kristina Wong's #FoodBankInfllluencer. To further increase participation, events were tied to First-Year Experience (FYE) credits. Feedback was collected through post-event surveys and participant engagement. While response rates were limited, findings showed strong student interest in expanded food access, with 100% of student respondents indicating they would benefit from free campus food options. Community members also expressed a willingness to support food security initiatives through time, resources, and funding. This project shows how art-based programming and community engagement approaches can reframe stigmatized public health issues, increase participation, and encourage activism. Findings from this work have informed the development of a "Take one, Leave One" campus food program.

# eHealth Literacy and Social Media: Evaluating College Students' Health Information Verification and Sharing Behaviors

**Marley Ackley**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 6

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
This study examined how undergraduate college students used social media to access health information and how eHealth literacy influenced their ability to evaluate, verify, and share that information. Social media platforms such as Instagram, TikTok, and YouTube were widely used by students to obtain health-related content, particularly nutrition and lifestyle information. While these platforms offered accessible and engaging opportunities for health education, concerns remained regarding misinformation, source credibility, and students' ability to critically assess the information they encountered. Prior research suggested that health literacy played a key role in shaping individuals' ability to evaluate online health information, yet gaps remained in understanding how students actively verified and responded to social media content. A cross-sectional quantitative survey was conducted among undergraduate students at Fairfield University using an anonymous online Qualtrics questionnaire. A target sample of approximately 70-100 participants aged 18 and older was recruited through campus-wide communications and student networks. Measures included social media use for health information, eHealth literacy assessed using the eHealth Literacy Scale (eHEALS), and platform and content format preferences. Primary outcomes assessed verification behaviors (e.g., cross-checking sources, evaluating content creators), sharing behaviors, and confidence in assessing credibility. Sociodemographic variables were also collected. This study hypothesized that higher eHealth literacy was associated with increased verification behaviors and reduced sharing of unverified information. Findings from this study provided insight into how health literacy influenced students' interactions with social media health content and informed strategies to improve critical evaluation skills and reduce the spread of misinformation among college populations.

# E-Cigarette Use, Dependence, and Associated Factors Among Undergraduate Students at Fairfield University

**Mackenzie Bourque**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 7

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Nicotine is a highly addictive, dependence-inducing drug found in electronic cigarettes (e.g., vapes) that can hinder neural development; however, research is still needed to determine the long-term effects of e-cigarette use and dependence. E-cigarettes have become the highest-selling nicotine product in the United States among youth, and the age group with the highest frequency of e-cigarette engagement is young adults ages 18-24 years. More specifically, college students have been classified as an at-risk population for e-cigarette use and dependence, highlighting the need for more specialized public health interventions for this group. Research indicates that college students typically engage in e-cigarette use at social gatherings, and they are more likely to use e-cigarettes if they are surrounded by peers who also use e-cigarettes. Moreover, college students reported using e-cigarettes as a means of coping with stress, and e-cigarette use among college students also varies greatly by sex and academic field of study. Most of the existing research on this topic fails to explore stress as a predictor of e-cigarette use and dependence among college students. I sought to address this gap in the literature by collecting data using a cross-sectional online survey administered through the Qualtrics platform. Participants were full-time, Fairfield University undergraduate students and were recruited via email and virtual messages (e.g., Blackboard Learn, iMessage). The survey consisted of multiple-choice and Likert-scale questions to evaluate e-cigarette use patterns and dependence among students, overall stress levels, and individual characteristics (e.g., field of study and class year). A portion of the questions have been adapted from existing questionnaires (Penn State Electronic Cigarette Dependence Index and the Perceived Stress Scale). The purpose of this study was to determine whether e-cigarette use and dependence among Fairfield University undergraduate students were associated with stress or individual characteristics. The results could be used to inform future health interventions related to e-cigarette use in college-aged populations.

# From Information to Immunization: Health Literacy and Vaccine Acceptance Among Undergraduate College Students

**Margaret Chmelicek**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 8

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Health literacy is the ability of individuals to find, understand, and utilize information andservices to make informed decisions about their health. When individuals struggle to understandmedical information, they may be more vulnerable to misinformation, less likely to getpreventative care, and less confident in navigating healthcare decisions. In the United States,limited health literacy is a widespread issue, and is relevant among college students, who beginto take greater responsibility for their own health. Vaccine acceptance is one area where healthliteracy can play an important role. Although vaccines are one of the most effective methods ofdisease prevention, vaccine hesitancy continues to impact public health. Research suggests thatknowledge, attitudes, and trust influence vaccination decisions, and that students with strongerhealth literacy skills may feel more confident evaluating health information and makinginformed choices. With this research, I explored the relationship between health literacy andvaccine acceptance among undergraduate students at Fairfield University. Using a cross-sectionalsurvey, I collected data on students' understanding of health information and their attitudestowards recommended vaccines, including influenza, HPV, and COVID-19. I also examineddifferences across academic disciplines to better understand how student's educationalexperiences may shape their health related decision making. Ultimately, this study aims toincrease awareness of how students understand health information and make informed decisionsabout their own health.

# Preventable Youth Mortality in the United States: A Health Education Intervention to Improve Awareness of Firearm-related Deaths

**Kelly Cullen**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 9

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Research over the last decade has confirmed that firearm-related mortality in the United States has become a critical public health crisis, particularly among minors and young adults. As mortality patterns in developed nations shift away from infectious diseases, youth deaths are increasingly driven by preventable, human-caused factors. Despite the impact of this crisis in the U.S., limited research has examined college students' awareness of firearm-related deaths, their causes, or effective prevention strategies. The purpose of this study was to evaluate whether a brief educational intervention could improve awareness of firearm-related mortality as a public health issue, knowledge of prevention strategies, and support for policy change among individuals aged 18 to 23 years. This study used a quasi-experimental pretest-posttest design, in which participants completed surveys before and after viewing a brief educational video.

# "Train Hard. Respond Faster. AED Skills for Athletes"

**Gillian Deans**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 10

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Sudden cardiac arrest in younger athletes, while rare, needs immediate response andproper AED use to ensure a lifesaving method. Automated external defibrillators (AEDs) arehighly effective in restoring a normal heart rhythm, with survival rates increasing significantlywith prompt and proper use. Despite the presence of AEDs in many schools, high school studentathletes tend to lack adequate knowledge of function and location, leading to delayed response inemergencies. This gap highlights the needs for a more targeted education and hands-on trainingto improve awareness, confidence, and preparedness among high school student athletes.

In this project, I designed and evaluated a brief education program to expand andimprove high school students' knowledge, awareness, and confidence in using automatedexternal defibrillators (AEDs) during emergency situations. The program consisted of a shortpresentation that provided information on the purpose of AEDs, steps for how to activate and usean AED properly, and the importance of a timely response in cardiac emergencies. After thebrief presentation, the participants engaged in a hands-on training session using an AED to buildtheir skills and confidence. To evaluate the program's effectiveness, student athletes completed abrief post-program survey to assess their knowledge of AED use, awareness of AED locationswithin the school, and confidence in responding to an emergency.

# Understanding Academic Stress Among Undergraduate Students at Fairfield University

**Cailyn Germond**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 11

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Academic stress is a growing concern among undergraduate students, and it can have a negative impact on both academic performance and overall well-being. College students face a variety of stressors including demanding coursework, competitive environments, and external pressures. Previous research suggests that excessive workload and high academic expectations contribute to increased levels of stress among students. However, there is limited research that examines how academic factors such as major, course-load, class sizes, and perceptions of faculty support relate to academic and overall stress in a university setting. The purpose of this study was to identify key contributors to academic stress and assess coping strategies associated with reduced stress. I used a cross-sectional study design to collect data using a 5-10 minute online questionnaire distributed through Qualtrics. Participants were undergraduate students currently enrolled at Fairfield University and were recruited through email. This survey used multiple choice and Likert scale questions that assess demographic characteristics, academic workload, perceptions of academic pressure, overall stress, and coping strategies. Some of the questions in the survey were adopted from the Perception of Academic Stress scale.

# Associations Between Structural Determinants, Patient–Provider Communication, and Mammography Screening Knowledge Among Women Aged 40–74 Years

**Maryam Gharmal**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 12

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Breast cancer remains the second leading cause of cancer-related death among women, yet disparities in screening remain due to factors such as insurance coverage, transportation access, and differences in communication with healthcare providers. Previous research suggests that women who lack insurance coverage or have poor communication with providers are more likely to have limited knowledge of screening guidelines and face greater barriers to care. While structural determinants and interpersonal factors have been studied independently, only a few studies have examined how these factors interact to influence both knowledge and access to breast cancer screening. This study examined associations between structural determinants and patient–provider communication with breast cancer screening knowledge and barriers to breast cancer screening among women ages 40 to 74 years in the United States. A cross-sectional quantitative survey design was used, and data were collected through an anonymous online Qualtrics questionnaire. Women ages 40 to 74 years in the United States were recruited through social media platforms and community networks. Measures included health insurance status, transportation access, travel time to healthcare providers, and patient–provider communication experiences related to breast cancer screening. Primary outcome measures were knowledge of screening guidelines, perceived barriers to obtaining a mammogram, and self-reported screening behaviors. Additional sociodemographic variables such as age and race or ethnicity were also assessed. I hypothesized that women with greater access to resources and improved communication with healthcare providers would exhibit higher screening knowledge and report fewer barriers to care. Findings from this study can be used to inform programs to improve awareness of and increase access to breast cancer screenings.

# Evaluating the Impact of an Educational Intervention on Provider Knowledge and Confidence in Cervical Cancer Screening: A Quality Improvement Study

**Maya Hemak**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 13

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Cervical cancer remains a preventable cause of morbidity and mortality despite the availability of human papillomavirus (HPV) vaccination and evidence-based screening guidelines. National benchmarks, including Healthy People 2030 targets and Health Resources and Services Administration (HRSA) quality metrics, emphasize timely cervical cancer screening, yet rates remain inconsistent across community health centers. To support achievement of these benchmarks, HRSA introduced the Cancer Screening Community Health Quality Recognition (CHQR) badge, awarded annually to community health centers that demonstrate excellence in care. In 2025, HRSA federally qualified health centers were required to achieve a cervical cancer screening rate of 79.2% to qualify for the badge. At The Wright Center for Community Health, 37.8% of eligible patients completed cervical cancer screening in 2025. Research indicates that provider knowledge and confidence in applying screening guidelines influence adherence, and targeted educational interventions can improve preventative care. The purpose of this quality improvement study is to evaluate changes in healthcare providers' knowledge and confidence regarding cervical cancer screening and to assess their perceptions of the intervention's impact. Using a pre-test, intervention, and post-test design, eligible providers (n= 228) employed at The Wright Center, including physicians, resident physicians, nurse practitioners, physician assistants and nurses, were recruited via email to complete an anonymous pre-test. Participants then viewed a 10-minute educational video integrating U.S. Preventive Services Task Force guidelines, cervical cancer education, and clinical decision-support tools, and subsequently completed a post-test. The pre- and post-tests included multiple-choice and dichotomous (yes/no and true/false) knowledge questions as well as Likert-scale questions. Two weeks post-intervention, participants will complete an open-ended survey to capture qualitative perspectives. Findings are expected to inform strategies for improving guideline adherence and increasing screening rates at The Wright Center, offering a model for provider-focused interventions in community health settings.

# Predictors of Sports-Related Injuries in Female Collegiate Athletes: The Role of Sleep and Training Load

**Konstanze Hofmann**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 14

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Sports-related injuries are common in college athletes and can negatively impact athletes' athletic performance, academic success, and mental health. While some risk factors, such as gender, age, and type of sport, are not modifiable, others like sleep and training load can be adjusted to minimize injury risk. However, there is limited research on modifiable predictors of injury among female college athletes. Therefore, the aim of this study was to examine the relationship between sleep quality, sleep duration, training load, and sports-related injuries among female student-athletes at Fairfield University.A cross-sectional online Qualtrics survey was administered to female student-athletes playing fall sports: field hockey, soccer, and volleyball. The survey assessed their sleeping habits, weekly training load (including strength training, conditioning, and practice), and injury history during their most recent competitive season (Fall 2025). Understanding these relationships may help to identify modifiable risk factors and develop strategies to reduce injury risk. The findings of this study could support not only athletes optimizing their athletic performance but also coaches and athletic trainers in modifying training load for their teams to reduce preventable sports-related injuries among female college athletes.

# Exploring Stress, Trauma, and Coping Mechanisms Among First Responders; A Qualitative Study

**Isabella Inzero**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 15

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
First responders, including firefighters and Emergency Medical Services (EMS) providers, are frequently exposed to high-stress incidents and potentially traumatic events as part of their daily occupational responsibility. Recurrent exposure to traumatic incidents such as emotionally distressing calls, severe injuries, casualties, and gruesome scenes may put first responders at an increased risk for developing post-traumatic stress disorder (PTSD), burnout, and other adverse psychological outcomes. Although existing research has documented these outcomes in first-responders, there is limited research on how first responders subjectively experience these events, including how they define a "traumatic" call, the effects of responding to such calls, and how they cope with these experiences. The purpose of this qualitative study was to explore how firefighters and EMS personnel experience and perceive stress related to responding to emergency calls, how they define traumatic calls, and the coping mechanisms they use in response. To capture the lived experiences of these professionals, I conducted 11 one-on-one semi-structured interviews. Audio recordings of the interviews were transcribed and analyzed using thematic analysis to identify themes and shared meanings across participants' personal narratives.This research prioritized the voices of first responders by providing real insight into their lived occupational experiences and perceptions of trauma. The results can contribute to a deeper understanding of occupational stress among first responders and can inform the development of useful support systems and mental health interventions for first responders in the future.

# From Cities to Countrysides: Differences in Infant and Toddler Feeding Knowledge and Beliefs

**Lliana Joe**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 16

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Background: Children living in rural areas are at greater risk of developing childhood obesity, which is a risk factor for several chronic diseases. Many chronic diseases can be controlled or prevented by maintaining a healthy diet, beginning after birth; therefore, parental adherence to evidence-based pediatric nutritional guidelines that inhibit obesogenic feeding behaviors is important for lowering a child's risk of diet-related chronic disease incidence.Objectives: To assess associations between residence in rural urban or suburban areas in the United States and infant and toddler feeding knowledge and beliefs.Methods: US women with children aged 1–4 years (n = 934) completed an online survey assessing their infant and toddler feeding knowledge, beliefs and practices; area of residence; and demographic characteristics. Chi-square tests, and post hoc pairwise comparisons with Bonferroni correction were used to identify significance of associations. Kruskal Wallis and post hoc Mann Whitney tests were used to analyze significance of predictors of overall knowledge.Results: Compared to suburban mothers, a smaller proportion of urban mothers identified that adding cereal to a baby bottle is not an effective way to help a baby sleep (P

# Associations Between Tanning Behaviors and Skin Cancer Knowledge, Attitudes, and Health Beliefs Among College Students

**Anna Kenny**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 17

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Objectives:The purpose of my study was to examine the relationship between tanning behaviors and skin cancer knowledge, attitudes, and sun protection practices among college students. I aimed to better understand how students engage in tanning behaviors and whether knowledge about skin cancer translates into protective behaviors.Methods:I conducted a cross-sectional study using an online survey distributed to college students (N = 49). The survey assessed demographics, tanning behaviors (indoor and outdoor), sunscreen use, sunburn history, and knowledge of skin cancer risks. Descriptive statistics were used to summarize responses and identify patterns in behaviors and knowledge.Results:The majority of participants were undergraduate students (94%), with a sample largely composed of women (66%). Overall, participants demonstrated high knowledge of skin cancer risks, with 94% correctly identifying the risks of indoor tanning and 98% recognizing that sun exposure can occur on cloudy days.Despite this, protective behaviors were inconsistent. Only 13% of participants reported always using sunscreen when exposed to the sun for extended periods, and 38% reported never including SPF in their daily routine. Additionally, 46% reported applying sunscreen only once without reapplying.Risky tanning behaviors were also common, with 29% reporting tanning outdoors without sunscreen and 58% reporting that they tan often or always during sunny months. Furthermore, 27% of participants reported having used indoor tanning beds.Sunburn prevalence was high, with 54% of participants reporting experiencing three or more sunburns within the past year. Overall, these findings indicate a gap between knowledge and actual sun protection behaviors among college students.Conclusions:Although knowledge of skin cancer risks was generally high among participants, this did not consistently translate into protective behaviors. Risky tanning practices and inadequate sunscreen use remain prevalent among college students. These findings highlight the need for targeted health education interventions that focus not only on increasing knowledge but also on promoting behavior change and improving sun safety habits.

# The Effect of Public Health Poster Framing on Exercise Motivation in Undergraduate Students

**Olivia Kuselias**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 18

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
Physical activity is crucial for overall health, yet many college students fail to meet recommended physical activity levels. Colleges frequently use posters and visual materials to promote exercise; however, there is little evidence about which types of messages actually motivate students to be active. This study examined whether appearance-based or well-being-based public health poster messaging more effectively motivates undergraduate college students at Fairfield University to exercise. Two posters were created for this study which were identical in design, but differed in message framing. One emphasized appearance-based benefits such as muscle tone and physical confidence, while the other emphasized well-being-based benefits such as heart health and sleep quality. Undergraduate students were recruited via virtual message (iMessage, GroupMe, etc.) and by instructors through word-of-mouth and email. Fifty-two Fairfield University undergraduates completed the survey via Qualtrics and completed a 5-minute online questionnaire including validated self-report scales such as the RM-4 to measure baseline motivation for physical activity, the CRAVE scale to assess motivation to exercise in the moment, and the Body Appreciation Scale-2 (BAS-2) to measure body image. Within the survey, students were randomly assigned to view one of the posters. The findings suggest that the type of message framing did not significantly influence exercise motivation or body appreciation. There were no statistically significant differences observed between groups across all three outcome measures (motivation to be active, motivation to rest, and body appreciation). These results indicate that appearance-based and well-being-based poster messaging may be similarly effective (or ineffective) in motivating college students to exercise, highlighting the need for more targeted health communication strategies. This research adds to evidence on health communication for how universities can more effectively design physical activity messaging to college students.

# Snack Without Stigma

**Alana Planas**

Faculty Mentor: Dr. Bridget Hussain, Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 19

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

*This research was supported by the McGuinness Fund*

**Abstract:**
Food insecurity is increasingly recognized as a public health concern on college campuses. National estimates vary widely, suggesting that 19% to 56% of college students experience food insecurity, which is much higher than the 2024 prevalence of adult food insecurity, estimated to be 13.7%. Food insecurity, particularly among college students, has been linked to negative mental health outcomes, poor academic performance, and reduced diet quality. Although many universities offer food support programs, utilization remains inconsistent due to barriers such as perceived stigma, disclosure concerns, and conflicting self-identity. This highlights that the availability of food resources alone is insufficient if psychosocial barriers limit their use. The purpose of my program evaluation is to assess student perceptions of a universally accessible "grab-and-go" snack program, Snack Without Stigma, implemented on campus in AY2025-2026. The program was designed to reduce stigma and normalize food access through inclusive messaging (e.g,. "Give one, Take one. Help Yourself!) and by eliminating formal eligibility requirements. The study will collect data using a Qualtrics survey distributed via QR code at the snack box location. Through this research, I aim to evaluate whether a universally accessible, stigma-conscious food support model can reduce psychosocial barriers and improve student experiences. Findings from this will be used to inform future campus interventions and provide a scalable approach for addressing food insecurity while preserving student dignity and agency.

# Trust, Trends, and Treatment: College Students' Perceptions of GLP-1 Medications for Weight Loss

**Danielle Seaman**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 20

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
The increasing popularity of GLP-1 receptor agonists has significantly transformed approaches to weight loss and obesity management. While clinical evidence supports the effectiveness of GLP-1 medications, public perceptions—particularly among young adults—remain mixed. Attitudes toward these novel medications can be influenced by social media, stigma, and concerns about safety, cost, and long-term effects. The purpose of this study was to address a gap in GLP-1 research by focusing on college students, a population that is highly exposed to health information on social media and is at a critical stage of making independent healthcare decisions. This cross-sectional study examined how undergraduate seniors at Fairfield University perceive the safety and trustworthiness of GLP-1 medications for weight loss and how likely they are to use them in the future. An online survey was distributed to students 21-23 years of age. Measures included awareness of GLP-1 medications, knowledge of their clinical indications, trust in their safety and efficacy, willingness to use the medications in the futureand personal or vicarious experience with GLP-1 medications. Additional measures included sources of health information, and concerns about GLP-1 medications such as side effects, cost, and social stigmas. Descriptive statistics were used to summarize participants' characteristics and key study variables. Bivariate analyses were conducted to examine relationships between demographic factors and attitudes toward GLP-1 medications. Findings will provide insight into young adults' perceptions of emerging medical treatments and may inform future health communication strategies.

# Trust, Influence, and Intent: How Young Adults Respond to Probiotic Advertising

**Sarah Whitaker**

Faculty Mentor: Dr. Kimberly Doughty

Egan School of Nursing and Health Studies

Booth: 21

*This research is affiliated with Delta Omega Public Health Capstone Candidate*

**Abstract:**
The dietary supplement market, specifically the probiotic supplement, has grown rapidly in recent years as public interest in digestive health has increased. Supplement marketing = often includes simplified or exaggerated claims to reach a specific audience who may or may not be educated in the complexity of the gut microbiome. Current studies demonstrate that misleading messages about probiotic dietary supplements are prevalent on social media. In this study, I examined how marketing messaging influenced trust and purchase intentions toward a mock probiotic product. A sample of participants aged 18–24 was surveyed using an online Qualtrics questionnaire. In the questionnaireeach respondent was presented with one of two contrasting mock advertisements– one that highlighted scientific claims or clinical effectiveness and one that included more vague, "buzzword"-based messages– and then evaluated the credibility of the advertisement and reported their purchase intentions. Findings from this study provide insight into how different marketing strategies shape consumer trust and decision-making in the supplement industry and can be used to inform more effective and responsible health communication targeting young adults.

# Alarm Fatigue and its Impact on Patient Safety

**Amanda Alboum**

Faculty Mentor: Karianne Webb

Egan School of Nursing and Health Studies

Booth: 22

**Abstract:**
Alarm fatigue, the desensitization to frequent clinical alarms, is a significant patient safety concern on high-acuity floors such as cardiology. Nurses on a cardiology unit addressed concerns regarding excessive alarms contributing to delayed responses and missed critical events, ultimately impacting patient care. The main issue is improving nurses' ability to recognize clinically significant alarms and respond appropriately. The greatest learning need is increasing awareness of alarm prioritization and the associated safety risks. A flyer was created to display in the break rooms for nurses to read on their break, emphasizing key warning signs and useful interventions. This flyer will be reviewed by the unit for future education and new nurses to read, promoting improved patient safety.

# The Early Implementation of Palliative Care for Pediatric Oncology Patients

**Hannah Aldieri**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 23

**Abstract:**
Early implementation of palliative care involves initiating supportive care at the time of diagnosis rather than at the end of life. This is important as palliative care improves quality of life, helps manage symptom burden, and provides the child and family with an additional layer of support. Oftentimes, palliative care referrals are made late in the disease process due to misconceptions and a lack of provider education. This idea was developed through clinical experience on a pediatric hematology/oncology floor, where delayed palliative care consults were observed. This project involved creating an educational infographic to give to families to help them better understand what palliative care is and the support it can provide. The hope is for this to be handed out to all families upon their child's cancer diagnosis, increasing the early implementation of palliative care on the floor.

# Non-pharmacological Interventions to Improve Sleep Quality in Adult Patients

**Avery Amato**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 24

**Abstract:**
Sleep disturbances are very common among hospitalized patients and can negatively affect healing, recovery, and outcomes. Factors like noise, bright lights, interruptions, and pain make it difficult for patients do get restorative sleep. While sleep medications are commonly used to solve this issue, they can increase fall risk and cause unwanted side effects, making holistic alternatives crucial. Research shows the use of non-pharmacological methods, such as environmental changes and relaxation techniques, are simple and effective ways to improve sleep. This project aims to educate and give nurses strategies they can use in daily care. By using these techniques, nurses can improve patient recovery, reduce complications, and perform more holistic, patient-centered care.

# Nurses Early Detection of Sepsis in Oncology Patients

**Sofia Anthony**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 25

**Abstract:**
The purpose of this capstone project is to improve nurses' early detection of sepsis in oncology patients. This topic was chosen because early detection of sepsis is a clinical concern, especially on this floor, because of the vulnerable population and cancer diagnosis. The goal of this project is to educate nurses on early detection in order to enhance recognition of sepsis and ensure timely intervention. Having a quick recall tool for signs and symptoms, along with their treatments, is necessary in the fast-paced clinical setting. Oncology patients are often immunocompromised as a result of chemotherapy, radiation, and underlying disease processes, which can mask typical signs and symptoms of infection. Recognizing sepsis can be difficult as a result of this. Ensuring that nurses have the proper teaching and techniques to detect this is very important, especially on an oncology floor, where patients are at greater risk of deterioration. This project was appropriate for this unit due to the high volume of patients with cancer and the risk of sepsis.

# The Importance of Oral Care Education in Preventing Mucositis Among Pediatric Oncology Patients

**Olivia Avigliano**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 26

**Abstract:**
A patient centered handout was developed after completing a review of literature on the topic of preventing mucositis in the pediatric oncology population. The handout was designed to be used in the development of an oral care plan for the patient. Brushing twice a day with a soft bristled toothbrush, rinsing with saltwater/baking soda rinse, and daily oral checks were all highlighted as ideal prevention techniques. A handout is the chosen method of education because it is easy to distribute, supportive of multiple learning styles, and can be taken home with patients after they are discharged. Based on findings from multiple peer reviews, providing written education on oral hygiene options for patients receiving chemotherapy could be effective in decreasing the severity of mucositis and increasing patients quality of life. Managing these symptoms can decrease pain, risk of infections and improve overall oral function.

# The Importance of Improving Discussions on Palliative Care

**Samantha Bacarella**

Faculty Mentor: Dr. Rose Iannino-Renz, Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 27

**Abstract:**
Patients and their families in the hospital frequently face the challenge of accepting a a serious illness, often lacking information about palliative care. It has been studied and observed that medical professionals commonly struggle to discuss the subject of palliative care. Palliative care serves as a vital resource, helping patients manage  symptoms alongside their treatment with help from their interdisciplinary team. This project aims to equip nurses with a deeper understanding of palliative care, clarify common misconceptions, and provide guidance on how to initiate conversations with patients without hesitation. Various patients, their families and loved ones, and even members of the healthcare team may not fully grasp the distinction between palliative care and hospice care, which can contribute to their hesitation to engage in these discussions. An improvement in discussions on palliative care is essential for early symptom management, autonomy in decision making, and creating clear and concise goals in patient care.

# The Importance of Early Postpartum Ambulation to Prevent Hemorrhage

**Gabriella Barragan**

Faculty Mentor: Dr. Rose Iannino-Renz, Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 28

**Abstract:**
The purpose of this capstone project is to examine the role of early postpartum ambulation as a preventative intervention for postpartum hemorrhage (PPH) and other complications. Postpartum hemorrhage remains a leading cause of maternal morbidity and mortality, with uterine atony identified as the primary cause.Clinical observations revealed that patients who ambulated earlier demonstrated improved recovery outcomes, including better uterine tone and reduced complications. However, many postpartum patients remain sedentary due to pain, fatigue, and lack of understanding of the importance of early movement.The literature supports early ambulation as an evidence-based intervention that promotes circulation, enhances uterine involution, and reduces the risk of complications.This project focuses on developing a patient-centered educational tool to encourage early ambulation and improve postpartum recovery and patient safety.

# Improving Nurse-Led Dysphagia Screening to Reduce Aspiration Pneumonia in Acute Stroke Patients

**Caitlyn Barry**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 29

**Abstract:**
In a stroke medical-surgical unit, it was found that aspiration pneumonia related to inconsistent nurse-led swallow screenings has been identified as an area for improvement for the bedside nursing staff during the admission process. This topic is critical to patient safety, as early nurse-led screening can significantly reduce complications, hospital length of stay, and healthcare costs. The greatest learning need identified is inconsistent screening practices and lack of standardized protocols among nursing staff. An infographic placed in the nurse's station will provide clear guidance on when and how to screen and implement interventions to improve compliance with swallow screenings and improve patient outcomes with adequate repositioning and timely screening.

# Enhancing Treatment Adherence and Outcomes: Benefits of Long-Acting Injectable Naltrexone

**Rebecca Beauvais**

Faculty Mentor: Laura Conklin, Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 30

**Abstract:**
A Connecticut step-down unit noted an increase in patients experiencing alcohol withdrawal. Nearly 8% of U.S. individuals aged 12 and older have alcohol use disorder (AUD), yet most do not receive counseling or medication management (Magane et al., 2025). Medication adherence is also a persistent challenge in nursing practice. A literature review highlighted that extended-release injectable naltrexone, administered monthly, offers several advantages over daily oral naltrexone. Benefits include higher adherence, fewer heavy drinking days, reduced length of stay in future admissions, and comparable overall cost. Based on this evidence, a flyer was developed to educate physicians about the benefits of extended-release injectable naltrexone and support its use as a treatment option for patients with AUD.

# Assessing the Impact of Sleep Hygiene Education and Shift Recovery Strategies for the New Graduate Nurse

**Grace Benziger**

Faculty Mentor: Jennifer Balzi

Egan School of Nursing and Health Studies

Booth: 31

**Abstract:**
New graduate nurses often face difficulties as they transition from student to professional nurse, including immense stress and sleep deficits. Poor sleep hygiene and high stress levels contribute to negative patient outcomes, along with harmful health effects on the nurses themselves. Poor sleep hygiene and increased stress levels in nurses also contribute to negative health outcomes, including increased occurrence of mental health conditions, cardiovascular and metabolic disorders, and poor nutrition. Assessing the impact of sleep hygiene and stress levels in new graduate nurses is essential in the development of shift recovery strategies, which can help reduce the harmful impacts of these conditions. Developing stress reduction methods and healthy sleep hygiene habits can help improve nurses' overall health and job performance. This study aims to educate and provide new graduate nurses with shift recovery strategies to improve their sleep quality and stress as they transition from student to professional nurse.

# The Importance of Discharge Education about Anticoagulants & Antiplatelets

**Caroline Bosse**

Faculty Mentor: Karianne Webb

Egan School of Nursing and Health Studies

Booth: 32

**Abstract:**
The purpose of this capstone project is to address the need for improved discharge teaching on anticoagulants and antiplatelets for the patient population on a cardiac unit. This topic was selected due to the high risk complications posed by these medications and their widespread use by cardiac patients. Clinical observation revealed many patients being discharged lacked understanding of the purpose and complication risks of anticoagulants and antiplatelets. The goal of this project is to develop a patient-centered educational tool to enhance discharge teaching, improve medication adherence, and help reduce medication complications and hospital readmissions. Recent literature indicates anticoagulants are a significant contributor to adverse drug events and hospital readmissions, but can be reduced through patient education. Research supports that medication education must be visual and easily comprehendible. The infographic created presents key education information in an understandable and accessible format. This promotes patient safety by improving medication adherence, increasing patient's ability to recognize complications, and therefore helps prevent hospital readmission.

# Effective I&O Tracking: Improving Accuracy to Strengthen Cardiac Patient Care

**Brooke Boulanger**

Faculty Mentor: Karianne Webb

Egan School of Nursing and Health Studies

Booth: 33

**Abstract:**
Accurate intake and output (I&O) measurement is critical for safe and effective cardiac patient care, as fluid imbalance significantly impacts treatment planning and clinical outcomes. While working on a medical-surgical cardiology unit at a local hospital in Connecticut, gaps in I&O documentation were identified among nursing staff, including RNs and nursing assistants. These inconsistencies can lead to inaccurate assessments and unnecessary alterations in clinical decision-making, potentially compromising patient care. This capstone project addresses this learning need through the development of an educational tool designed to improve I&O accuracy and consistency among the nursing staff, enhancing cardiac patient care.

# Increasing Patient Education and Awareness on Postpartum Preeclampsia in Women of Color

**Elizabeth Bowler**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 34

**Abstract:**
Abstract:Postpartum Preeclampsia (PE) is a rare, life-threatening complication of birth where there is a severe increase in blood pressure up to 6 weeks after the baby is born. Preeclampsia tends to affect women of color, specifically Black and African-American women higher than Asian or White women. While on the unit, a learning need was identified to increase education on awareness and knowledge of postpartum PE. Because this learning need was acknowledged, a literature review was conducted to investigate. Literature findings indicate that there is a knowledge deficit regarding postpartum PE, which leads to an increased risk of future cardiovascular issues. That said, using clinical education tools are crucial in promoting PE understanding and improving the health of the postpartum mother. These tools can help mothers' awareness of what is going on physiologically, and avoid any crises and emergencies related to PE.Keywords: postpartum preeclampsia, knowledge deficit, promote understanding, and avoid crises.

# The Importance of Staff Awareness on Facilitating Family Presence During CPR

**Angelina Brandon**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 35

**Abstract:**
Family members can often be excluded from resuscitation events due to concerns of interference with care, emotional distress, or the added stress it puts on healthcare staff. Family presence during resuscitation (FPDR) is defined as giving the option for one or more family members to be present in the room during the patient's resuscitation event which allows the family to have physical and visual contact with the patient. The family member should be accompanied by a designated support person. FPDR began in the early 1980s in response to family needs during critical health care situations and the AACCN formally supported this intervention by the 1990s. FPDR serves to meet the emotional needs of both patients and their families. Family members of patients who undergo resuscitation may experience complex psychological challenges including anxiety, depression, or post-traumatic stress symptoms. FPDR is psychologically beneficial for family members present during cardiac arrests regardless of treatment outcomes. Resuscitation quality, pharmacological and non-pharmacological interventions were not different between hospitals with and without a FPDR policy. A significant number of studies also show patients are in support of having relatives at the bedside during resuscitation. This project aims to educate nursing staff on the evidence-based guidelines for facilitating FPDR.

# Reducing Self-Extubation While Minimizing Restraint Use in Mechanically Ventilated Patients

**Macey Brown**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 36

**Abstract:**
Patients receiving mechanical ventilation are frequently placed in physical restraints to prevent accidental removal of endotracheal tubes; however, restraint use is associated with increased agitation, delirium, and decreased patient comfort. Nurses identified a need for safer, patient-centered alternatives. This project aimed to educate nursing staff on evidence-based strategies to reduce restraint use while maintaining patient safety. Key interventions included an in-service and an educational infographic highlighting approaches such as pain management, optimized sedation, delirium prevention, early mobility, and family engagement. Implementation increased staff awareness of alternative strategies, improved patient comfort and autonomy, and enhanced nurse-patient-family communication. Findings support the use of structured, multidisciplinary interventions to promote safer, more compassionate care while reducing reliance on physical restraints.

# Supporting Recovery: Implementing Bedside Signage to Guide Safe Positioning for Patients with Hemiparesis

**Megan Bucherati**

Faculty Mentor: Cara Tietjen

Egan School of Nursing and Health Studies

Booth: 37

**Abstract:**
Stroke patients with hemiparesis often experience weakness or inattention to one side of the body, which increases their risk for falls, injury, and difficulty with mobility. On the Ortho/Neuro/Stroke Unit, this concern was identified as a learning need for nursing staff, who must consistently recognize the patient's weak side to ensure safe positioning, safe transfers, and proper call bell placement. When nurses are unaware of the affected side, patients may be positioned unsafely or may not have access to essential items, which can compromise safety and independence. A review of the literature showed that spatial cognition deficits, unilateral neglect, and impaired mobility all contribute to increased fall risk in stroke patients. Research also indicates that environmental cues, such as signage and visual reminders, can improve staff awareness and support safer care practices. Educational tools have been shown to enhance nursing competence and promote consistent practice in fast paced clinical environments.

# Improving Patient Safety Through Increased Nursing Knowledge of the Hospital Diet Manual

**Samantha Campo**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 38

**Abstract:**
Healthcare in the U.S. follows a primarily reactive model, focusing on treating illness after they occur. Consequently, patients first seek medical attention when their symptoms interfere with daily life. Healthcare providers then focus on these conditions, leading to costly interventions and contributing to a cycle of managing existing conditions rather than preventing them. The U.S. has a dire need for proactive healthcare, that emphasizes health promotion, education and early intervention to keep people healthy and reduce medical costs. The diet manual is a required, evidence based resource, providing detailed therapeutic diets and nutritional standards for various conditions. It's a critical education tool for nurses to maintain patient safety and interdisciplinary communication. It enhances nurses' ability to provide effective patient education, improving adherence to prescribed diets and supporting long term health. Increased nursing knowledge and utilization of the diet manual is essential to high quality, patient centered care and illness progression.

# Social Support as a Factor in Post-Discharge Outcomes of Orthopedic Surgical Patients

**Jacqueline Caraco**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 39

**Abstract:**
This research examines the impact of social determinants of health on patient outcomes following orthopedic surgery. The postoperative recovery phase extends beyond hospital discharge, where patients transition from structured clinical support to home-based care. While patients receive comprehensive monitoring and assistance in the immediate postoperative setting, successful recovery after discharge depends heavily on external factors such as social support, access to transportation, financial stability, and availability of follow-up care. A review of current literature indicates that patients with strong support systems and adequate community resources experience improved healing outcomes, fewer complications, and reduced hospital readmissions compared to those with limited social support. These findings highlight the importance of addressing social determinants of health as part of discharge planning to optimize recovery and long-term patient outcomes.Keywords: support, orthopedic surgeries, social determinants of health, discharge

# Improving Nurse Confidence and Competence in End-of-Life Conversations

**Alivia Cararo**

Faculty Mentor: Briana Marzigliano

Egan School of Nursing and Health Studies

Booth: 40

**Abstract:**
End-of-life conversations are an important part of nursing care, but many nurses, especially new grads, feel uncomfortable or unprepared starting them. After observing the floor in this clinical rotation, there were many situations where both nurses and patients struggled with these discussions. As more patients live with serious illnesses, nurses are becoming more involved in conversations about palliative care, advance directives, and treatment goals, making this an important issue for patient safety and outcomes.This capstone project focuses on ways to improve nurses' confidence and communication skills through education, training, and mentorship. When nurses feel more prepared, they can better support patients and families in making informed decisions, leading to more patient-centered care and improved quality of life. The goal is to create a resource for unit orientation, or general use on the floor, to help nurses feel more confident and supported during these conversations.

# The Importance of Education on Labor Positioning

**Lauren Carlin**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 41

**Abstract:**
The purpose of this capstone project is to develop an educational resource for mothers in labor that outlines various positioning techniques to reduce pain, enhance comfort, and minimize labor-related risks. This initiative emphasizes nurse-led education grounded in evidence-based practices with the goal of empowering mothers to make informed decisions about their positioning throughout the labor process.Clinical observations on a Labor and Delivery unit indicated that the majority of mothers labored predominantly in the supine position, with minimal variation of repositioning. Additionally, there appeared to be limited nursing education provided regarding the benefits and implementation of position changes during labor. Current literature supports the use of frequent position changes, demonstrating that allowing freedom of movement and positioning can positively impact outcomes for women undergoing vaginal delivery (Sun et al., 2025). Such practices not only improve maternal comfort but also facilitate fetal descent and optimal rotation within the pelvis (Sun et al., 2025).This capstone project highlights current evidence related to labor positioning and underscores the importance of incorporating structured educational tools into clinical practice. Providing mothers with accessible, evidence-based information during labor has the potential to enhance their overall experience, reduce adverse outcomes, and promote patient autonomy.

# Determining Patient Acuity on a Stepdown/Intermediate Care Unit

**Caroline Carnes**

Faculty Mentor: Laura Conklin, Dr. Jenna A. LoGiudice

Egan School of Nursing and Health Studies

Booth: 42

*This research was also presented at the National Student Nurses Association Convention 2026 (Houston, TX)*

**Abstract:**
The stepdown unit can be a catch all unit for patients of varying acuity and needs. In observations at a hospital in Southern, Connecticut, there have been patients with varied admission diagnoses ranging from: detoxing from illicit substances/alcohol, recovering from cardiac procedures, and those having neurology concerns, active gastrointestinal bleeds, mental health concerns or severe wound care needs. The nursing care and needs of these patient populations vary deeply for day-to-day care which is driving this project on patient acuity.Observations made on a stepdown unit revealed a significant lack of staff education on determining acuity. The whiteboard acuity scales were often left blank, or filled in with a “2” if staff were unsure. Staff are also forgetting to update their patient’s acuity when it changes during the shift – it is known that patient conditions can change quickly on a medical stepdown floor and documenting this is important to patient safety. Informal conversations with nurses, CNA’s, and the dietician aided my recognition of the lack of uniformity in identifying patient acuity. The purpose of this capstone project is to condense various patient care acuity scales and provide stepdown nurses one tool to best identify patient acuity. The goal of this nurse led education is to communicate the evidence-based practices methods for determining acuity in the year 2026. The literature on patient acuity levels has changed following the covid-19 pandemic and resources for staff to help to identify their patient's acuity are available. The association between accurate patient acuity determination and adequate nursing staffing of the unit will be described.Overall, implementing use of an evidence-based standard acuity tool for nurses to identify and reassess patient acuity on a stepdown floor will allow for more enhanced patient safety and adequate staffing by nursing leadership.

# Reducing Hospital-Acquired Pressure Injuries Through Evidence-Based Bed Selection

**Claire Carney**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 43

**Abstract:**
Hospital-acquired pressure injuries (HAPIs) remain a preventable source of patient harm. This project aims to reduce unit-acquired pressure injuries by implementing a nurse-driven bed selection decision tree that links Braden Scale scores and continence level to appropriate support surfaces. Evidence shows that targeted education improves nurses' performance using the Braden Scale to predict pressure ulcer risk, supporting risk-based interventions at the bedside (Ahmed & Hassan, 2025). Current guidelines emphasize that choosing an appropriate support surface is essential for both prevention and treatment of pressure injuries and should be guided by structured algorithms and clinical judgment (McNichol et al., 2020; International Guideline, 2025). Cochrane reviews and more recent critical appraisals demonstrate that specialised mattresses, overlays, and alternating-pressure surfaces are more effective than standard hospital mattresses for preventing and treating pressure ulcers (Shi et al., 2021a; Shi et al., 2021b; Blackburn et al., 2024). By providing a clear, visual tool that connects risk assessment to bed choice, this project supports consistent, evidence-based nursing practice and has the potential to lower HAPI rates on the unit.

# The Impact of Early Palliative Care in Improving Symptom Management in Cardiac Patients

**Eugene Gerard Castillo**

Faculty Mentor: Briana Marzigliano

Egan School of Nursing and Health Studies

Booth: 44

**Abstract:**
The purpose of this capstone project is to raise the awareness of early palliative care for patients with cardiac illnesses. The main goal is to emphasize why palliative care should be utilized early, rather than it being too late and used for end-of-life.
Palliative care is a type of specialized care that can be used at any stage of an illness to enhance one's quality of life. Heart failure is a progressive, severe illness that leads to poor quality of life, high symptom load, and psychological distress. Studies have shown that palliative care improves symptom management, leads to less rehospitalizations, and enhances the plan of care. Despite this, patients receive it either late or never.
This capstone project educates viewers on what palliative care truly is, why it is essential, how early involvement can support a patient holistically, and how it improves the patient's plan of care.

# The Importance of Safe Sleep Practices to Reduce the Risk of SIDS

**Olivia Charbonnier**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 45

**Abstract:**
Sudden Infant Death Syndrome (SIDS) is the unexpected or sudden death of an infant during the period of birth to one year of age. Although the exact cause is unknown, it is often associated with unintentional or accidental trauma due to unsafe sleeping environments. It is crucial for parents to be educated on proper safe sleep practices because unsafe sleeping environments drastically increase an infant's risk for SIDS.

It was noted on a busy maternity unit, that many parents did not know what a safe sleep environment was and were unaware of what items should or should not be in their child's crib. Conversations with both new parents and the nurses on the unit, revealed that there was a knowledge deficit amongst parents about safe sleep practices for infants and why they are so important.

The literature demonstrated that many parents lacked knowledge on proper safe sleep practices for infants or received conflicting information about safe sleep from different sources. This indicates a need for nurse-led client education about proper safe sleep practices for infants and the dangers of not abiding by these guidelines.

This capstone project aims to address the knowledge deficit by providing clear, evidence based education to parents about proper safe sleep practices for infants. Implementing the use of a user-friendly handout on proper safe sleep techniques, to be distributed by nurses to all parents, will help educate families on what safe sleep practices are, serve as a reference for them to look back on, and ensure that their infants are always in a safe sleeping environment and protected from accidental injury.

# Improving Patient Safety and Communication Through Bedside Shift Report

**Caroline Chase**

Faculty Mentor: Laura Conklin

Egan School of Nursing and Health Studies

Booth: 46

**Abstract:**
Bedside shift report is a standard practice that supports effective communication during shift change and promotes patient safety and quality care. On a mid-size step-down unit in an urban hospital in Connecticut, it was observed that bedside shift report was not consistently performed. This gap can lead to miscommunication and place patients at increased risk for harm. It was identified as a key learning need, prompting a review of the literature to further explore the issue. The idea for this project was developed after a student nurse recognized inconsistent handoff practices. In response, an infographic was created for staff to serve as a visual reminder of the importance of bedside shift report. This intervention aims to increase awareness, promote consistent use of bedside report, and improve communication and patient safety. The goal is for this tool to be reviewed and incorporated into practice across the unit.

# Improving Infection Prevention Through Nursing Education on Chlorhexidine Wipe Use

**Nicole Cianflone**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 47

**Abstract:**
Chlorhexidine Gluconate is an antiseptic and an antimicrobial agent that is used in health-care to decrease bacteria growth. Healthcare-acquired Infections (HAIs), are seen throughout the hospital setting worldwide. These lead to an increase in morbidity, mortality and overall health care costs leading to the need of prevention. In the healthcare setting such as a medical-surgical floor there is a broad base of patients who are at risk of forming an infection. This includes patients who have central lines, peripherally inserted central catheters also known as PICC's, Foley catheters, obese and others who have co-morbidities. This capstone targets chlorhexidine gluconate wipes as an evidence- based practice intervention to reduce HAIs. As well, this capstone will evaluate the effectiveness of the wipe usage, staff compliance mainly with Nurses and Patient Care Technicians while also looking at patient outcomes and potential decrease of HAIs. The overall goal is to emphasize the importance of CHG bathing within this unit but also the need for patient safety during hospitalization.

# The Importance of an Inclusive Bedside Report to Improve Patient Experience

**Alyssa Colombrita**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 48

**Abstract:**
During my capstone clinical rotation on a stroke/medical-surgical floor at an urban hospital in the spring semester, I noticed that many patients were not fully aware of how important bedside shift reports are to understanding their care. Bedside shift report occurs when nurses exchange patient information at the bedside during shift change. When patients are unaware of this process, they may miss opportunities to ask questions, clarify their treatment plan, or participate in discussions about their care. This lack of awareness can negatively affect the patient experience and limit engagement. The purpose of this project is to educate patients about the importance of bedside shift reports between nurses and other members of the healthcare team. By increasing patient knowledge, healthcare providers can empower patients to participate in care and advocate for communication. To support this goal, an infographic was created to be distributed to patients upon admission.

# Improving Patient Education to Improve Patient Compliance: Chlorhexidine Bathing to Prevent Central Line Infection

**Abigail Colson**

Faculty Mentor: Genevieve Dafonte, Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 49

**Abstract:**
The purpose of this project is to improve patient understanding of Chlorhexidine bathing and the role it plays in preventing central line infections through the development of a patient-centered educational infographic. The goal of patient education is to provide clear information explaining what a central line is, why infection risk is increased, and how CHG bathing helps prevent bloodstream infections. A QR code is also included to allow patients to access a visual resources.During clinical experience on a medical-surgical unit, it was observed that patients with central lines expressed reluctance or refused to participate in CHG bathing. Patients frequently reported discomfort with the bathing process while revealing a lack of understanding of the purpose and importance of CHG bathing in infection prevention. This observation highlighted a potential learning need among patients regarding the role of CHG bathing in preventing infection.Central venous catheters are commonly used in hospitalized patients, and while these devices are essential for patient care, they also increase the risk of central line–associated bloodstream infections (CLABSIs). Infections such as these are associated with increased morbidity, mortality, and healthcare costs. Evidence-based infection prevention strategies, including daily bathing with chlorhexidine gluconate (CHG), have been shown to significantly reduce the risk of bloodstream infections in patients with central lines.By improving patient understanding of infection prevention practices, this project aims to encourage patient participation in CHG bathing and support hospital efforts to reduce healthcare-associated infections. Enhancing patient education may contribute to improved patient compliance with hygiene protocols and promote safer patient outcomes.

# Fall Prevention in Older Adults at Increased Risk

**Catherine Comstock**

Faculty Mentor: Christina Cannone-Epstein

Egan School of Nursing and Health Studies

Booth: 50

**Abstract:**
The purpose of this capstone project is to describe the risk of falls in older adults and how to prevent these falls. Observations at my clinical rotation revealed that several patients were hospitalized or treated due to a fall.Further, the demographic trend of older Americans becoming a higher percentage of the country's population indicates that without intervention and education regarding preventing falls, hospitalization and treatment of patients will increase. This capstone project describes common causes of falls and recommended steps to prevent these. Falls can occur as a result of effects of medication, lack of balance and strength, home impediments, vision challenges and outdoor elements. Prevention can include educating patients about effect of medication, perhaps changes to medication or medication timing, exercises to increase strength and improve balance, ensure proper vision correction and home maintenance including rail installation.

# Improving Recognition of Postpartum Preeclampsia through Patient Education

**Elizabeth Corrigan**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 51

**Abstract:**
Postpartum preeclampsia (PPPE) is a serious and often under-recognized condition that frequently develops after discharge, increasing the risk for maternal morbidity and mortality. This project was developed in response to a clinical learning need identified on a maternity unit, where many postpartum patients lacked knowledge of PPPE warning signs and appropriate follow-up care. The goal of this project is to improve patient awareness through the implementation of a single-page educational handout outlining risk factors, symptoms, and guidance for seeking appropriate medical attention. Research shows that delayed recognition of PPPE is associated with unfavorable outcomes, and that severe complications such as eclamptic seizure and stroke often occur in women without prior hypertensive disorders . By enhancing patient education, this intervention aims to support early recognition and timely intervention. This project reinforces the essential role of patient education and the prevention of maternal complications.

# Oral Mucositis Prevention and Care

**Jennie Coscia**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 52

**Abstract:**
Oral mucositis is a common complication of chemotherapy that can significantly affect a patient's quality of life. It is the inflammation of the mouth's mucous membranes, which can lead to pain, burning, ulcers, difficulty swallowing or speaking. This can affect the patient's healing, nutrition, and treatment plan, causing it to be delayed. The purpose of this capstone project is to identify the prevention and care strategies for oral mucositis and to educate the oncology nursing staff so these practices can be implemented. It was identified on an oncology unit where patients receiving chemotherapy were reporting oral pain and cold sores. An educational flyer was created to provide instructions on how to care for oral mucositis as it is a concern with oncology patients. By providing the nurses with the flyer, they will understand how to treat patients with this complication, ensuring better comfort, healing, and overall treatment experience.

# Early Recognition of Sepsis in Adult Medicine Patients

**Shae Cunningham**

Faculty Mentor: Dr. Katherine Saracino, Genevieve DaFonte

Egan School of Nursing and Health Studies

Booth: 53

**Abstract:**
Early recognition of sepsis in adult medicine patients is essential to improving patient outcomes and reducing mortality. Sepsis is a life-threatening condition that can rapidly progress if not identified and treated promptly, yet early signs such as subtle changes in vital signs or altered mental status are often overlooked or misattributed in clinical practice. Based on observations from a medical unit, this project identified a need for enhanced nurse education on early sepsis recognition and consistent use of standardized screening tools. The purpose of this project was to improve nurses' ability to identify early signs of sepsis through targeted, concise education and the implementation of a visual infographic designed for quick bedside reference. By providing accessible educational resources and reinforcing key clinical indicators, this project aims to promote timely escalation of care, improve clinical judgment, and enhance patient safety on this medicine unit.

# Infection Prevention in Vascular Access: The Impact of Alcohol-Impregnated Caps

**Cara Curtin**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 54

**Abstract:**
Central line associated bloodstream infections (CLABSIs) remain a significant threat to patient health and safety, particularly among the immunocompromised population. Throughout my clinical experience on an oncology floor, inconsistent use of disinfection caps on intravenous access points was observed; this identified as a gap in infection prevention practices compared to other oncology hospitals I had worked at. This capstone project aimed to address this issue by sharing evidence based strategies to reduce infection risk. Emphasis was placed on simplifying clinical information to increase adherence in a fast paced environment. This project is set to enhance nursing compliance with infection prevention protocols, reduce CLABSI rates, and improve patient safety outcomes with diligent application of passive prevention strategies.

# Cognitive Overload in Nursing: Risks to Patient Safety

**Kara Davidson**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 55

**Abstract:**
Patients are put at risk of adverse health events when nurses experience the burden of working within their complex workflow. Nurses have time sensitive tasks, have to manage patient and family interactions, communicate with interdisciplinary team members, all while maintaining patient safety. This can greatly impact their efficiency in delivering safe, patient centered care. On a medium sized progressive care unit in an urban setting, understanding cognitive burden was identified as a learning need and a literature review was carried out to further investigate how patients and nurses are impacted by various factors within an acute care environment. Findings indicate that patient outcomes are impacted by improper management of the nursing workload, further contributing to burnout. A tool that applies directly to nurses' mental health was developed in order to decrease the stigma around advocating for help of self or of another coworker. This tool gives nurses the ability to prioritize themselves because patient care cannot be improved without recognition that there is a standing problem and factors that contribute to it.

# The Impact of Informed, Family Centered, Culturally Competent Care on Pediatric Patients

**Allison Dealy**

Faculty Mentor: Tina Budd

Egan School of Nursing and Health Studies

Booth: 56

**Abstract:**
Family-centered, culturally competent care for the pediatric population is imperative to ensure high quality care. While completing a clinical rotation on a 28-bed medical surgical unit at a pediatric hospital in urban Connecticut, an educational need was identified regarding the individuality of patients and how to create a plan of care from a holistic perspective. Collaborating with family when caring for pediatric patients allows for healthcare workers to provide more atraumatic care and improve the quality of patient care. A questionnaire was developed for families to complete, capturing information such as the patient's preferences, cultural considerations, and primary language. The goal is to incorporate this into the routine admission assessment and include it in the patient's chart to support improved quality of care.

# The Importance of Bowel Regimens for Postoperative Patients

**Ava DeFilippis**

Faculty Mentor: Tina Budd

Egan School of Nursing and Health Studies

Booth: 57

**Abstract:**
This project aimed to improve patient/family education and understanding of postoperative constipation. Its goals are to promote patient advocacy and reduce knowledge deficit related to constipation. Increased knowledge can enhance confidence in prevention and treatment strategies. During my clinical on a medical-surgical unit, a significant number of postoperative patients were identified as high risk for constipation; however, a lack of awareness amongst patients and families was evident and led to risk factors and complications. A targeted patient education model was identified as a necessary intervention. The literature highlights the high prevalence of postoperative constipation and its negative impact on recovery. Although no single standardized approach has been established, the literature outlines various interventions related to this issue. This capstone project aims to influence nursing practice by providing an easy-to-read guide for postoperative patients and caregivers. Additionally, it seeks to increase awareness of constipation, which, when addressed, can improve outcomes.

# Improving Medication Safety in Older Adults Through Patient-Centered Discharge Education

**Lauren DeLaurentis**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 58

**Abstract:**
Polypharmacy, the use of five or more medications, is common among older adults and increases the risk of adverse drug reactions, medication errors, and hospital readmissions (Hung et al., 2024). Many patients are discharged with multiple medications but have a limited understanding of their purpose, side effects, and proper administration, representing a critical learning need. To address this, a patient-centered handout was developed, including a medication table, safety reminders, and a teach-back section to engage patients in their care. This project aims to improve patient safety, medication adherence, and outcomes during transitions of care. By providing clear and accessible education, this intervention empowers patients, reduces the risk of errors, and supports nurses in delivering consistent discharge teaching, ultimately enhancing the quality and safety of care for older adults.Keywords: polypharmacy, older adults, patient education, teach-back, medication safety, medication adherence, transitions of care, discharge teaching

# Safe Glycemic Management in Hospitalized Acute Stroke Patients: A Nursing Education Initiative

**Emma DelVecchio**

Faculty Mentor: Jennifer Balzi

Egan School of Nursing and Health Studies

Booth: 59

**Abstract:**
Blood glucose fluctuations are common in hospitalized stroke patients and are associated with poorer neurologic outcomes, higher mortality rates, larger infarction sizes, and more. Stress-induced, treatment-related, and intrinsically based hyperglycemia and hypoglycemia all present significant clinical risks to the patient within their stroke management care and recovery. Hyperglycemia during acute stroke contributes to secondary brain injury through metabolic and vascular mechanisms, worsening neurologic outcomes. Acute care nurses play a crucial role in glucose monitoring, insulin administration, and symptom recognition in glucose-related neurologic changes. Variability in nursing practices and care, including uncertainty of optimal glycemic control, highlights the need for focused nursing education in this area. The purpose of this project is to provide an evidence-based nursing education initiative targeted at improving understanding and utilization of glucose monitoring in hospitalized stroke patients. This presentation serves to review current evidence and research regarding glycemic control in stroke patients, emphasize important glucose management practices, and provide methods to prevent neurologic complications. By enhancing nursing knowledge and promoting consistent practices, this project seeks to reduce negative outcomes and complications tied to poor glycemic control, improve patient safety, support optimal recovery for patients, and more.

# Promoting Family Participation in Patient Education to Improve Recovery Outcomes in Hospitalized Adult Patients

**Julia DeVos**

Faculty Mentor: Briana Marzigliano

Egan School of Nursing and Health Studies

Booth: 60

**Abstract:**
The purpose of this capstone project is to promote family participation in patient education to improve recovery outcomes in hospitalized adult patients. A lack of family involvement contributes to poor communication, non-compliance with medication, and increased readmissions, negatively affecting patient outcomes. The biggest learning need identified was educating nurses on how to actively include family members during teaching. The idea developed after observing that families were present but not engaged during patient education. The project was completed by creating an infographic guiding nurses on strategies to involve families. This intervention is expected to improve understanding, adherence, communication, and recovery outcomes.

# Bridging the Gap: Improving Patient Understanding of the Daily Plan of Care

**Julie Diktas**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 61

**Abstract:**
The purpose of this capstone project is to examine nurse-facilitated communication strategies to enhance patient understanding of the daily plan of care during hospitalization. The goal is to introduce nurse-led interventions that can be implemented to promote clear and consistent communication with patients about their reason for admission, planned tests, medications, and expected discharge date. This particular Medical-Surgical unit has a large population of older adults and stroke patients, who reveal frequent confusion regarding their hospitalization. Conversations with patients at clinical identified gaps in understanding related to treatment and discharge expectations. Contributing factors include unclear updates, delayed provider communication, and incomplete bedside whiteboards. Research suggests that using structured communication tools, including bedside shift report, medication teaching, and visual aids like whiteboards, improves patient comprehension and satisfaction. Nurse-led communication practices will help bridge the gap between patients and their healthcare team, thereby better preparing them for discharge and transitions of care.

# Importance of Parent Education on Newborn Thermoregulation Relating to SIDS

**Sofia DiStefano**

Faculty Mentor: Kathryn Manfredo

Egan School of Nursing and Health Studies

Booth: 62

**Abstract:**
Sudden Infant Death Syndrome (SIDS) is the unexpected and unexplained death of an infant. While there is no official known cause, there are many risk factors that can be managed and prevented with education provided to families and caretakerssuch as avoiding overheating of the infant. On a maternity unit in a small community hospital, a learning need for SIDS prevention was identified and a literature review was conducted. The literature showed that an increase in education and advocacy decreased SIDS rates. It also showed an increase in the prevalence of SIDS since 2020 (CDC, 2024). The need for education by nurses and other healthcare staff after delivery was highlighted in the literature, with a high priority for proper implementation of sleep positioning, clothing, and environment for the infant to prevent overheating and subsequently reducing the risk of SIDS.

# Improving Patient Compliance with Incentive Spirometry in COPD Patients

**Amanda Donabedian**

Faculty Mentor: Michele Lecardo

Egan School of Nursing and Health Studies

Booth: 63

**Abstract:**
Chronic Obstructive Pulmonary Disease (COPD) is a progressive inflammatory disease that causes narrowing of the airways, making it difficult to breathe. It is characterized by emphysema, in which the alveoli are not able to participate in gas exchange, and or chronic bronchitis, which involves inflammation and narrowing of the bronchial walls. Adhering to appropriate treatments and lifestyle modifications can help manage and prevent exacerbations. Through observation and care of multiple patients with COPD hospitalized in a 200-bed hospital in urban Connecticut, it was noted that patients were inconsistently utilizing their incentive spirometers despite patient education. After caring for several patients with exacerbations, this learning need was identified as an opportunity to help prevent exacerbations and promote airway management. In response, a handout was made for both inpatient and at-home use, outlining the proper use, benefits, and potential complications associated with noncompliance with an incentive spirometer.

# Type 2 Diabetes: Patient Education on the Control and Management of Blood Sugar to Prevent Osteomyelitis

**Lucy Dumont**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 64

**Abstract:**
The purpose of this capstone project is to highlight the importance of proper maintenance and control of Type II Diabetes Mellitus (T2DM) to patients to avoid preventable conditions like osteomyelitis. With proper nurse to patient education on T2DM, the goal would be to see patients taking their T2DM more seriously, resulting in better blood sugar control and limiting cases of osteomyelitis seen related to T2DM. There is a large number of patients who are diagnosed with T2DM and after observing and talking to these patients it was revealed that they control their T2DM, therefore leading them end up in the hospital for treatment for osteomyelitis, or they never received proper T2DM education, therefore not knowing how to manage their blood sugars, which resulted in them getting osteomyelitis. Knowledge deficit is the key factor here on the effects of how patients with T2DM are ending up in the hospital with osteomyelitis. Literature gives us an abundance of information on the effects of uncontrolled T2DM, however that same literature is targeted at medical professionals. Being able sit down with patients to go over T2DM management and control, and give them proper education and tools to manage their T2DM could ultimately result in better outcomes for patients living with T2DM and will lead to less instances of hospitalizations related to preventable infections like osteomyelitis.

# Stroke Patient Education and Teach-Back Effectiveness

**Amanda Dunleavy**

Faculty Mentor: Cara Tietjen

Egan School of Nursing and Health Studies

Booth: 65

**Abstract:**
The objective of this capstone project is to evaluate the effectiveness of nurse-led patient education following a stroke in reducing hospital readmissions. The project focuses on educating patients about lifestyle modifications after a stroke and ensuring comprehension to support successful recovery and prevent rehospitalization. Evidence indicates that the stroke population experiences a high rate of hospital readmissions, with patients frequently expressing confusion and concern regarding necessary lifestyle changes after discharge. This project aims to address these gaps through targeted, nurse-driven education strategies.

# Clarity in Care: A Nurse's Guide to Dementia Management

**Olivia Duprat**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 66

**Abstract:**
Dementia is a progressive cognitive disorder that significantly impacts patient safety, communication, and quality of care. A key learning need that was identified was the gap between theoretical knowledge and practical skills of nurses in communicating with and caring for patients with dementia. This project was developed after recognizing the challenges within the clinical setting, particularly in managing agitation and confusion. An evidence-based infographic was created to provide concise, accessible education on effective communication strategies and interventions. This resource aims to improve and promote patient safety, reduce distress, and enhance care outcomes. It is the hope that this infographic with increase nurse confidence and competence that will lead to more empathetic, patient-centered care and meaningful improvements in the experiences of individuals living with dementia.

# Nursing Role in Code Status and Goal-of-Care Discussions

**Kailey Elmasian**

Faculty Mentor: Christina Cannone-Epstein

Egan School of Nursing and Health Studies

Booth: 67

**Abstract:**
Goals-of-care conversations help align care with patients' values, especially for older adults or those with serious illnesses. Many patients do not fully understand interventions like cardiopulmonary resuscitation (CPR), which have varying survival rates depending on the diagnosis. This knowledge gap can lead to decisions that are misaligned with patient goals or safety. I developed this topic after noticing that more elderly patients were assigned full code status despite complex conditions, highlighting the need for improved education. To address this, I created an evidence-based infographic for nurses to promote goals-of-care discussions and offer foundational education on this topic. By providing this tool, the hope is to improve patient understanding, support safe, patient-centered decisions, and enhance outcomes.

# The Importance of Nursing Education on Early Sepsis Interventions to Improve Patient Outcomes

**Hannah Falb**

Faculty Mentor: Dr. Katherine Saracino, Briana Marzigliano

Egan School of Nursing and Health Studies

Booth: 68

**Abstract:**
On a thirty bed medical surgical unit at a large urban teaching hospital in Connecticut, it was found that many nurses were caring for patients diagnosed with sepsis, and nurses expressed the need for education on the signs, diagnosis, and treatment protocols. Sepsis must be treated in a timely manner to ensure the best possible patient outcomes, and nurses are often the first ones to notice signs of infection, specifically sepsis in their patients. Nurses must be attentive to any indicators that a patient may be developing sepsis because the risk of mortality increases significantly with each hour of delayed treatment. This project provides a simple overview of the signs of sepsis and outlines how care should be escalated if a patient is suspected to be septic. The poster was designed to be hung at the nurses station to improve the timeliness of sepsis identification.

# When Alarms Become Noise: Addressing Alarm Fatigue on a Telemetry Floor

**Alexis Fasolas**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 69

**Abstract:**
Alarm fatigue is a common problem in hospitals, particularly on telemetry units where continuous cardiac monitoring is required. Alarms inform staff of changes in patient condition as well as equipment failures. Nurses are frequently exposed to an overwhelming number of alarms throughout their shifts. Sounds may be generated by monitors, ventilators, IV pumps, and other devices. Most of these alarms may not be clinically significant, but still warrant assessment. Over time, this can cause nurses to become desensitized to the noise thus leading them to respond more slowly or miss important alarms. This delay in response can place patients at risk for serious harm, including adverse events and decreased patient safety. Contributing factors to telemetry alarm fatigue include improper alarm parameter settings, patient movement, and a lack of standardized alarm management practices. The purpose of this project is to examine the causes and effects of telemetry alarm fatigue and to highlight evidence-based strategies to reduce its impact. Interventions such as nursing education, improvement in alarm management, and setting alarms based on individual patient needs will be reviewed. Addressing telemetry alarm fatigue is essential to enhancing patient safety, reducing nurse workload, and improving overall quality of care in hospital environments.Keywords: alarm fatigue, patient safety, evidence based strategies, alarm management

# Skin-to-Skin Contact in the Golden Hour

**Samantha Ferrari**

Faculty Mentor: Kathryn Manfredo

Egan School of Nursing and Health Studies

Booth: 70

**Abstract:**
Skin-to-skin contact involves placing a naked newborn in a prone position on the mother's bare chest immediately after birth or shortly thereafter. Observations during clinical in a sixteen bed labor and delivery unit identified immediate skin-to-skin contact during the "golden hour" as a key teaching point for mothers. Nurses expressed concern about the knowledge deficit among parents. A literature review was completed to assess the need to support and enhance patient education. The evidence reported back that skin-to-skin contact improves both maternal and neonatal outcomes. An educational poster was developed to be placed in every patient room to highlight the importance of this practice. The goal is for expectant mothers to have the opportunity to learn about skin-to-skin contact, understand its benefits, and feel empowered to ask questions prior to giving birth.

# Managing Chemotherapy Induced Nausea and Vomiting in Oncology Patients

**Courtney Ficarra**

Faculty Mentor: Dr. Katherine Saracino, Carolyn Previti

Egan School of Nursing and Health Studies

Booth: 71

**Abstract:**
Managing chemotherapy induced nausea and vomiting (CINV) is a critical priority in oncology nursing due to its significant impact on patient comfort, treatment adherence, and overall quality of life. The purpose of this capstone project is to address ongoing gaps in symptom control observed within the oncology population. This project involved the development of an evidence-based educational infographic designed for oncology patients, as well as oncology nurses to use as a teaching tool to support patient education on CINV management. The goal is to evaluate and promote evidence based interventions to improve CINV management and enhance patient outcomes. Current literature highlights that while pharmacologic therapies are effective, dietary and lifestyle modifications, as well as alternative therapies like acupuncture have also been proven to be effective. Addressing this need is essential to provide holistic, patient centered care. This project aims to support nursing practice by reinforcing patient education to improve symptom management and contributing to future advancements in oncology nursing care delivery.

# The Importance of Caregiver Education for Pediatric Fever Management in the Pediatric Emergency Department

**Katelyn Flynn**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 72

**Abstract:**
Fever is one of the most common chief complaints among children presenting to the pediatric emergency department (ED). Despite evidence showing that most pediatric fevers are benign and self-limiting, many caregivers experience significant anxiety regarding fever, a phenomenon referred to as “fever phobia”. Misconceptions surrounding pediatric fevers may lead caregivers to seek unnecessary emergency care, use antipyretic medications inappropriately, or misinterpret the severity of a child’s illness. In the pediatric emergency department, a need for improved caregiver education regarding pediatric fever management was identified. This project aims to develop an evidence-based discharge education handout to support caregivers in safely managing fever at home. A review of current literature highlighted common caregiver misconceptions about fever, inappropriate antipyretic use, and inconsistent temperature measurement practices. In response, a clear educational handout was developed for distribution at ED discharge. The handout provides information on fever definition, comfort measures, medication dosing, and indications for seeking medical evaluation. Implementing standardized educational resources may improve caregiver understanding, reduce anxiety related to pediatric fever, and decrease unnecessary ED visits while promoting safe and effective fever management at home.

# Reducing Hospital Readmissions for Heart Failure Patients

**Ava Foley**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 73

**Abstract:**
Heart Failure is a chronic condition common on cardiology floors, with symptom flare-ups often caused by medication non-adherence, fluid overload, dietary non-compliance, lifestyle factors, and infections. Patients are typically given health plans, but failure to follow them can be life-threatening. On a large urban cardiology telemetry unit, this project identified a need for targeted patient education to reduce readmissions. A literature review showed that individualized education improves patient understanding, medication adherence, and self-management, ultimately reducing hospital readmissions. Key factors contributing to readmission include lack of education at diagnosis, poor medication adherence, and insufficient follow-up. Implementing patient-specific education, behavioral strategies, and supportive tools can prevent exacerbations and improve outcomes. The purpose of this project is to implement and evaluate an individualized patient education intervention focused on improving self-management and reducing hospital readmissions in patients with heart failure. The intervention included the use of patient-specific education, simplified teaching tools, and reinforcement of medication adherence and lifestyle modifications throughout hospitalization and at discharge.

# Early Identification and Nursing  Interventions for Reducing Post-Stroke Depression

**Julia Foley**

Faculty Mentor: Cara Tietjen, Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 74

**Abstract:**
Post-stroke depression is a common and often under recognized complication that negatively affects recovery, quality of life, and overall health outcomes. Early identification of depressive symptoms is essential for timely intervention; however, screening practices are often lacking in clinical settings.This capstone project examines the importance of early identification and explores nursing interventions to reduce the prevalence of post-stroke depression. Clinical observations at an urban hospital in CT that specializes in neuro revealed many patients with unrecognized mental health concerns. This project includes an infographic for patients and families and highlights the role of nurses in recognizing symptoms and implementing appropriate interventions.Strategies such as routine depression screening, patient education, and nonpharmacological interventions are emphasized. The target audience includes post-stroke patients, their families, and nursing staff. Early intervention can improve recovery, reduce complications, and enhance overall well-being.

# Improving Patient Safety in the Management of ETOH Withdrawal

**Allison Fortier**

Faculty Mentor: Dr. Rose Iannino-Renz, Michele Lecardo

Egan School of Nursing and Health Studies

Booth: 75

**Abstract:**
The purpose of this capstone project is to identify areas for improvement in safely managing the care of patients withdrawing from alcohol (ETOH). Alcohol withdrawal is a multifaceted condition that can include anxiety, tremors, diaphoresis, irritability, agitation, hallucinations, insomnia, and vital sign changes (Bahji et al., 2022). Some individuals experience withdrawal symptoms more profoundly than others, where nurses play a crucial role in preventing the progression of symptoms to seizures or delirium tremens. Delirium tremens can present as disorientation and severe autonomic dysfunction, with potentially fatal outcomes (Wu et al., 2025). Nurses should utilize standardized tools such as the Clinical Institute Withdrawal Assessment for Alcohol Scale (CIWA-Ar), pharmacologic interventions, and fall prevention strategies to promote the safe care of patients withdrawing from alcohol. Clinical observations on a medical-surgical floor identified a significant population of patients withdrawing from alcohol in various stages. A number of patients experienced increased agitation and acute confusion, facilitating the need for prompt nursing recognition and intervention to promote safety. Conversations with nurses on the unit indicated that further education could help nurses effectively manage alcohol withdrawal symptoms, while also vigilantly attending to their other patients. The literature on alcohol withdrawal syndrome (AWS) revealed that more than half of those dependent on alcohol will experience withdrawal symptoms if they suddenly stop their consumption (Gamble and Thallas, 2022). Although nursing interventions for alcohol use are discussed in lecture, floor nurses can benefit from additional knowledge in order to care for this patient population in the clinical setting with confidence. Understanding how to care for patients exhibiting symptoms of alcohol withdrawal encourages timely response and communication with the healthcare team to prevent life-threatening complications.

# Patient Discharge Education on Oral Anticoagulant Safety Practices to Reduce Bleeding Complications

**Paige Fulton**

Faculty Mentor: Briana Marzigliano, Dr. Jenna LoGiudice

Egan School of Nursing and Health Studies

Booth: 76

*This research was also presented at the National Student Nurses Association Convention 2026 (Houston, TX)*

**Abstract:**
Prior to hospital  discharge, patient education on their prescribed medication regimen is paramount for positive patient outcomes. Education is a key aspect to the discharge planning because many patients do not have high health literacy when it comes to their medications. When patients leave without knowing the directions and proper ways to care for themselves, adverse effects can occur. Oral anticoagulants are one type of medication that require a significant amount of patient education. These high-risk medications are normally started in the hospital, and then patients need to learn how to look for signs of complications on their own. As patients are discharged from in-patient Medical-Surgical units with oral anticoagulants, verbalized instructions on interactions and possible bleeding complications that can arise can be forgotten as they are discharged.
Observations on a Medical-Surgical unit in a hospital in SouthernConnecticut, revealed an opportunity to create a clear education process that will ensure all patients being discharged on oral anticoagulants receive detailed information on this medication and its potential side effects. This was identified as a learning need, and a literature review was conducted to investigate the correlation between patient education and oral anticoagulant medication adherence to help create a potential solution. Findings indicated that there is a positive correlation between a higher level of knowledge a patient has in regards to anticoagulant therapy and improved outcomes with less bleeding complications. To meet this need, an informative tool was designed to help nurses in creating an efficient and effective way for vital information to be communicated during discharge teaching to all patients. The tool will include direct nursing instruction along with written information about foods that interact with oral anticoagulants, adverse effects, medication interactions, bleeding precautions, and the importance of medication adherence. This tool helps to ensure that patients understand their anticoagulant treatment during and after discharge.

# Diet Adherence and Weight Tracking for Patients with Heart Failure

**Emily Gale**

Faculty Mentor: Dr. Katherine Saracino, Meagan Wilson

Egan School of Nursing and Health Studies

Booth: 77

**Abstract:**
Heart failure remains a leading cause of hospital readmissions, often driven by poor symptom management and nonadherence to dietary and maintenance recommendations. On a 25-bed cardiac/telemetry unit in a 1,541-bed, non-profit, tertiary teaching hospital in southern Connecticut, patients with heart failure frequently return to the hospital. Frequent readmissions were due to symptom flare-ups, inadequate dietary adherence, and limited understanding of when to seek hospital care versus contacting providers for medication adjustments or alternative management strategies. Nurses have identified concerns related to inconsistent daily weight monitoring, poor dietary compliance, and ineffective symptom recognition. Additionally, patients have reported uncertainty in managing symptoms at home, as well as reluctance and inability to adhere to their prescribed dietary plan. This proposed project aims to address these gaps through development of structured educational resources, including affordable, heart-healthy meal guides, symptom tracking tools, and weight monitoring logs. The intervention is designed to improve patient self-management and clinical decision-making. Anticipated outcomes include improved adherence, enhanced symptom recognition, and reduced preventable hospital readmissions.

# Post-craniotomy infection prevention bundle in the neuroscience unit

**Jil Gallagher**

Faculty Mentor: Jennifer Balzi

Egan School of Nursing and Health Studies

Booth: 78

**Abstract:**
Post-craniotomy patients are at high risk for surgical site infections (SSIs), leading to increased morbidity and prolonged hospital stays. Major risk factors include cerebrospinal fluid (CSF) leaks, repeat surgeries, emergency procedures, and intracranial pressure (ICP) monitoring. Prophylactic antibiotics and standardized wound care protocols, such as chlorhexidine cleansing, proper hair care, and constant wound monitoring, have been shown to reduce infection rates by up to 50%. In addition, emerging research shows how 3D bioprinted scaffolds for localized antibiotic delivery as well as targeting certain immune system responses such as interleukin-10 (IL-10), strengthens immune response to fight off infection. This project demonstrates how using a collaborative approach combining prevention, evidence-based care, and emerging therapies is essential in reducing post-craniotomy infection rates and improving patient outcomes.

# Medical Device-Related Pressure Injury Prevention in Immobilized Patients

**Jolie Gambino**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 79

**Abstract:**
Medical device-related pressure injuries (MDRPIs) remain one of the most prevalent and preventable patient safety concerns in acute care nursing. Yet, they continue to be underrecognized and inconsistently addressed at the bedside. MDRPIs develop when external medical devices exert sustained pressure on the skin and underlying tissue during hospitalization, causing localized damage distinct from traditional pressure injuries in both etiology and presentation. Post-surgical and medical-surgical patients are at particularly high risk due to the combined effects of immobility, simultaneous exposure to multiple devices, altered sensory perception, and high-acuity care demands throughout their recovery. Discussions with staff in the post-surgical and medical-surgical units identified that immobilized patients connected to multiple devices were rarely receiving targeted education about the skin risks posed by those devices. Nurses, despite their knowledge, often lacked the time, staffing support, and standardized resources needed to consistently carry out MDRPI prevention at the bedside. The evidence-based literature presented in this project synthesizes findings from six peer-reviewed sources examining MDRPI risk factors, prevention interventions, nursing workload, and implementation strategies. Results indicate that bundled approaches combining prophylactic dressings, device repositioning, systematic skin assessment, and staff education demonstrate the strongest prevention outcomes, and that structured education and protocol implementation support improved nursing compliance with best practice recommendations. In connection with this research, a patient education handout was created to provide immobilized patients with the knowledge and language needed to recognize warning signs early, ask informed questions, and actively participate in their own skin safety throughout their hospital stay.

# Effectiveness of Nurse Recognition of Early DVT Symptoms and SCD Adherence in Reducing Venous Thromboembolism Rates

**Laura Garofalo**

Faculty Mentor: Briana Marzigliano

Egan School of Nursing and Health Studies

Booth: 80

**Abstract:**
Venous thromboembolism (VTE) is a preventable cause of illness and death in hospitalized patients. Nurses play an important role in recognizing early signs of deep vein thrombosis (DVT) and making sure preventative measures, such as sequential compression devices (SCDs), are used correctly. However, inconsistencies in symptom recognition and SCD use can increase a patient's risk for developing VTE. The purpose of this project is to educate nursing staff on the importance of early identification of DVT symptoms and consistent use of SCDs to help reduce VTE rates. Current literature supports that improved nurse education and adherence to preventative interventions significantly decrease patient complications. This project uses an educational pamphlet to present key information in a clear and accessible way. Increasing nurse awareness and compliance has the potential to improve patient outcomes and reduce preventable hospital acquired VTEs.

# Improving Patient–Clinician Communication in Orthopedic Surgery Through the Use of a Question Prompt List

**Rebecca Geis**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 81

**Abstract:**
The purpose of this capstone project is to improve patient-clinician communication on a surgical unit through the implementation of a Question Prompt List (QPL). The goal is to enhance patient understanding, promote active engagement, and reduce anxiety throughout all phases of the surgical experience, including preoperative, postoperative, and discharge. This project was developed in response to an identified learning need on a satellite hospital unit, where patients frequently expressed uncertainty about what questions to ask, the appropriate provider to consult, and how to remember complex information. Evidence from the literature suggests that unanswered questions contribute to decreased comprehension and increased anxiety, whereas QPLs improve communication and patient outcomes. The intervention has the potential to advance nursing practice by supporting patient-centered care, improving education, and strengthening therapeutic communication.

# Proactive Pressure Injury Prevention in Telemetry Patients

**Ashley Greene**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 82

**Abstract:**
A healthcare-acquired pressure injury (HAPI) is common, yet preventable within the Telemetry population, due to risk factors like impaired cardiac functioning, immobility, and reduced skin tolerance. One crucial learning need on the unit was raising nursing staff awareness of telemetry-specific factors contributing to the development of pressure injuries and proactive prevention methods. The purpose of this project is to educate telemetry nurses on the dangers of the high-risk cardiac population and how to improve skin-integrity practices. Staff on a Telemetry unit stated that HAPIs develop rapidly within this patient population. The infographic within this project was created to educate telemetry nurses of risk factors, effective interventions, and recommendations for care. It will be shared with the nurse manager of the unit in hopes that it could positively influence the unit in the future and reduce HAPI development.

# Skin-to-Skin Contact in the NICU: Impacts on Maternal Mental Health and Postpartum Depression

**Ashley Hallice**

Faculty Mentor: Kathryn Manfredo

Egan School of Nursing and Health Studies

Booth: 83

**Abstract:**
Skin-to-skin is an intervention done in the early postpartum period that has both maternal and infant benefits. For mothers with a child in the NICU, increased stress and decreased ability to bond immediately post-birth can increase their risk for developing postpartum depression. While completing a clinical rotation in a Level III NICU of a mid-sized non-profit community hospital, a learning need was identified for new mothers regarding education on how skin-to-skin can have a beneficial effect on maternal mental health and maternal-infant bonding. An educational pamphlet was created that parents can access and bring home to promote maternal mental wellbeing and encourage NICU mothers to feel empowered in their child's care.

# The Importance of Patient Education on the Adherence to Antihypertensive Medications to Prevent Stroke

**Alexa Hasapidis**

Faculty Mentor: Cara Tietjen

Egan School of Nursing and Health Studies

Booth: 84

**Abstract:**
The purpose of this capstone project is to highlight the importance of nurse-led patient education on the adherence to antihypertensive medications to prevent stroke. The goal of patient education is to improve medication adherence by helping patients understand the significance of consistent medication use and develop strategies to incorporate treatment into daily routines. During clinical rotations on an Ortho/ Neuro/ Stroke unit, it was identified that a significant number of patients were admitted for stroke due to nonadherence to their prescribed antihypertensive medications. This finding emphasized a critical need for targeted patient education on managing blood pressure, as well as more resources for nurses to use to facilitate these discussions. The literature on medication adherence suggested that controlling blood pressure with antihypertensives significantly decreases the risk for stroke. An educational tool was created to aid nurse-led conversations with patients about the importance of taking medications to manage hypertension and prevent stroke. This single-page handout allows nurses to provide consistent education on the role antihypertensive medications have in preventing stroke, to improve overall patient outcomes.

# Promoting Patient Safety in the Intensive Care Unit: Educating Families About the Purpose of Medical Restraints

**Nathan Hendriks**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 85

**Abstract:**
The use of restraints in the intensive care unit (ICU) is sometimes necessary to protect patients from removing life-sustaining medical devices during periods of delirium, agitation, or confusion. Despite their role in maintaining patient safety, restraints are frequently misunderstood by family members. During clinical experience in the Medical Intensive Care Unit (MICU), family members were observed removing restraints due to religious practices or cultural beliefs without fully understanding the associated risks. Removal of restraints may increase the likelihood of unplanned device removal, including endotracheal tubes, central venous catheters, and arterial lines, which can result in serious complications.Delirium is a common complication in critically ill patients, occurring in up to 20–50% of nonventilated patients and 60–80% of mechanically ventilated patients, and is associated with increased agitation and adverse outcomes. Unplanned endotracheal extubation is a significant patient safety concern and can lead to serious complications requiring emergency intervention. Additionally, family members of critically ill patients often experience psychological distress, which may influence how they interpret and respond to medical interventions.The purpose of this capstone teaching project was to develop a family-centered educational pamphlet explaining the purpose and safety considerations associated with restraint use in the ICU. By providing clear and accessible education, this project aims to improve family understanding, support communication between families and healthcare providers, and promote patient safety while maintaining culturally sensitive care.

# Pediatric Suicide Screening: Educating Nurses on the Columbia-Suicide Severity Rating Scale in Children Ages 4-7

**Ashley Henry**

Faculty Mentor: Tina Budd

Egan School of Nursing and Health Studies

Booth: 86

**Abstract:**
The purpose of this project is to educate nurses on how to properly screen young children for suicidal thoughts and behaviors, with the goal of increasing early identification and intervention. Suicide is the second leading cause of death in children ages 3 to 17 years. However, suicidal thoughts and behaviors (STBs) in children ages 4 to 7 are frequently overlooked due to a lack of knowledge and screening tools. The lack of validated suicide risk screening tools for children under age 8 emphasizes the need for an increased understanding about this population of children, especially by pediatric nurses who perform the initial assessments. In order to address these gaps in knowledge and resources, nurses should be educated on how to use the Columbia-Suicide Severity Rating Scale–a brief screening for suicidal ideation and behavior validated for children as young as age 4. An educational tool for nurses to increase familiarity and comfortability with pediatric suicide screenings will promote early detection of at-risk children by nurses, resulting in early intervention and improved outcomes.

# The Impact of Postpartum Visitor Limitations on Maternal–Infant Bonding and Breastfeeding Outcomes

**Ava Hiel**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 87

**Abstract:**
Early postpartum bonding and successful breastfeeding initiation are critical components of maternal–infant health; however, frequent hospital visitation may unintentionally disrupt these processes. On a large mother-baby unit in an urban setting, a learning need was identified among patients and families regarding the impact of visitors on rest, bonding, and breastfeeding establishment. This project aims to review research and develop an educational handout to inform postpartum mothers and their support systems about the benefits of limiting visitors during the immediate postpartum period. The goal is to meaningfully improve both short-term outcomes and long-term maternal-infant health while simultaneously enhancing unit workflow and care quality.

# Benefits of Standardizing Bottle Feedings for Infants with Failure to Thrive

**Colleen Horan**

Faculty Mentor: Tina Budd

Egan School of Nursing and Health Studies

Booth: 88

**Abstract:**
Lack of standardized evidence based feeding practices for infants with feeding difficulties contributes to suboptimal outcomes including regurgitation, inadequate intake, poor weight gain, and increased risk of prolonged hospitalization. Inconsistent cue based feeding and poor physiologic positioning can be improved among caregivers. This issue was observed in an inpatient pediatric medical surgical gastrointestinal unit. A literature review supported elevated side lying position to improve physiologic stability and cue-based feeds to promote effective intake. The review also highlighted limited evidence based research supporting burping practices. This project aimed to develop a reference tool to standardize feeding techniques. The tool provides visual references to help parents and guardians understand hunger and satiety cues as well as positioning recommendations. Implementation of this tool is intended to improve feeding safety and consistency as well as support earlier discharge readiness.

# Enhancing ETOH Patient Education on Managing Insomnia During Withdrawal

**Alyssa Hruby**

Faculty Mentor: Michele Lecardo

Egan School of Nursing and Health Studies

Booth: 89

**Abstract:**
Alcohol withdrawal is an ongoing issue in today's society that a large portion of our population struggles with on a regular basis. When observing and initiating informal conversations with ETOH patients on a medical surgical floor in an urban hospital, many of them were found to be suffering from insomnia during the withdrawal period. This made recovery even harder and increased the likelihood of a future relapse. However, most patients did not realize how much of a role sleep plays in recovery. There was a significant knowledge gap noted when it came to non-pharmacological sleep strategies used to combat insomnia during withdrawal and the importance of receiving adequate sleep during recovery. Literature on insomnia proved that withdrawal causes frequent awakening, inability to achieve deep sleep, sleeping fewer hours, and changes in normal sleep patterns. Literature also proposed effective non-pharmacological sleep strategies such as sleep hygiene, progressive muscle relaxation, light exposure therapy, exercise, and complementary medicine(yoga, acupuncture, aromatherapy, etc.). This capstone project highlights the importance of sleep during withdrawal and educates on non-pharmacological sleep strategies to combat insomnia through the use of an infographic that can be easily distributed to all ETOH patients on the floor. Having a simple and easily accessible education tool improves patient education and therefore improves patient outcomes.

# Delayed Bathing Benefits for Newborns on Hypoglycemic Protocol

**Jasmine Huntsman**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 90

**Abstract:**
Birth is a stressful event for any newborn, especially those at risk for hypoglycemia who require additional support to maintain physiologic stability. The purpose of this capstone project is to highlight the benefits of delayed bathing for newborns at risk for hypoglycemia and provide parent-focused education to support this practice. Evidence-based literature shows that delayed bathing promotes thermoregulation, stabilizes blood glucose, and supports newborn adaptation during the early hours of life. Observations on a maternity unit at an urban hospital in New England, identified that many newborns followed hypoglycemic protocols, yet delayed bathing was rarely explained to parents. Instead, it was often presented as a yes-or-no choice without explanation of its benefits. This project uses a simple, parent-friendly infographic to communicate important evidence-based information and reinforce consistent nursing education. It also promotes informed parental decision-making and safer newborn outcomes while supporting the use of simple, non-pharmacologic interventions in clinical practice.

# Improving Infant Safe Sleep Education for New Parents

**Gwenyth Iles**

Faculty Mentor: Kathryn Manfredo

Egan School of Nursing and Health Studies

Booth: 91

**Abstract:**
A safe sleep environment for an infant refers to sleep position, location, and environment (Walcott et al., 2017). Safe sleep is crucial for infant safety as it prevents suffocation, strangulation, and sudden infant death syndrome. However, many new parents do not adhere to safe sleep guidelines during their hospital stay and after discharge. New parents are often exhausted from childbirth and caring for their newborn, which may cause them to fall asleep with their baby (Ramos et al., 2023). They frequently lack the knowledge to understand the importance of a safe sleep environment. The need to increase parental knowledge of safe sleep was identified after observing multiple new parents on the unit not adhering to safe sleep guidelines. To address this concern, an infographic was created to put in a visible place in each room. The hope is that this tool will be referenced by parents during their hospital stay.

# Preventing Malnutrition in Brain Tumor Patients

**Elizabeth Joyce**

Faculty Mentor: Jennifer Balzi

Egan School of Nursing and Health Studies

Booth: 92

**Abstract:**
Malnutrition is a common and often overlooked complication in patients with brain tumors, contributing to increased morbidity, prolonged hospital stays, and decreased quality of life. This project aimed to explore evidence-based strategies to prevent malnutrition in neuro-oncology patients through early identification, nutritional screening, and targeted interventions. A review of current literature highlighted the importance of tools such as phase angle, CONUT score, and the Prognostic Nutritional Index in identifying at-risk patients, as well as the benefits of individualized nutrition plans and oral nutritional supplementation. In response, an educational infographic was developed to provide nutritional guidance for patients and support interdisciplinary care. Implementing early, holistic nutritional interventions can improve treatment tolerance, enhance recovery, and optimize overall patient outcomes.

# Enhancing Patient Education on Palliative Care and How it Differs from Hospice

**Alexandra Kaiser**

Faculty Mentor: Dr. Katherine Saracino, Karianne Webb

Egan School of Nursing and Health Studies

Booth: 93

**Abstract:**
Enhancing patient and family education on palliative care versus hospice care within a cardiology telemetry unit is very important. Patients with cardiac conditions often experience many symptoms that impose a significant burden. By receiving education on how to manage those symptoms, palliative or hospice patients and their families are able to make informed decisions that align with their goals of care. Misunderstanding these services can negatively impact patient safety by leading to delayed referrals, unmanaged symptoms, and increased emotional distress. Through clinical experience, there was a clear knowledge deficit on the unit among patients and their families. To bridge the gap, an educational handout was created to explain differences and similarities between palliative and hospice care. The goal is to improve patient understanding, support informed decisions, and ultimately enhance patient outcomes and satisfaction. The handout can be incorporated into routine patient education to promote consistent, patient-centered care.

# Redefining Care: Nurse-Driven Strategies to Reduce Delirium in Adult Critical Care Settings

**Emma Kaseta**

Faculty Mentor: Karianne Webb

Egan School of Nursing and Health Studies

Booth: 94

**Abstract:**
Delirium is a prevalent and serious complication among critically ill patients, often linked to prolonged hospital stays, long-term intellectual impairment and increased mortality. Despite its frequency, delirium is often under-recognized and can be prevented through non-pharmacological nursing interventions. The purpose of this capstone project is to explore nurse-driven strategies in adult critical care settings that help reduce the occurrence of delirium. Observations in clinical practice at a 305 bed acute care hospital revealed inconsistent implementation of interventions that aim to reduce confusion in critically ill adults. A review of current literature supports the success of multipart, non-pharmacological interventions in preventing delirium. This project highlights simple, evidence-based nursing practices - including maintaining patient orientation, promoting sleep and encouraging mental stimulation and engagement - all put together on an infographic for nurses to enhance patient safety, improve outcomes and empower nurses to play an essential role in delirium prevention.

# The Importance of “Scrubbing the Hub” on Peripheral Intravenous Lines in the Emergency Department

**Elodie Kermarrec**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 95

**Abstract:**
I had the opportunity to work in a 305-bed teaching hospital in urban Connecticut and spent time in the Emergency Department (ED), where peripheral intravenous (IV) catheters were used often to enable rapid medication and fluid delivery. However, if proper aseptic technique is not followed, they can lead to bloodstream infections. A key prevention practice is disinfecting needleless connectors, known as “scrubbing the hub,” by cleaning the IV port with alcohol or chlorhexidine before each use. Failure to do so allows microorganisms to enter the bloodstream, increasing infection risk and patient complications. In the fast-paced ED environment, time constraints and high patient volume can lead to inconsistent compliance. Studies have shown that consistently disinfecting peripheral IV hubs significantly decreases microbial contamination and enhances patient safety. This project aims to educate the nurses on the importance of consistent hub disinfection to enhance compliance and reduce infection risk.

# The Importance of Infection Prevention of Peripheral Intravenous Access in the Emergency Department

**Grace Kiernan**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 96

**Abstract:**
Peripheral intravenous (PIV) catheters are one of the most commonly used invasive devices in the emergency department (ED), yet they remain a significant source of bloodstream infections when proper aseptic technique is not followed. “Scrubbing the hub” prior to accessing a PIV is a simple, evidence based practice that significantly reduces microbial contamination and infection risk. Despite its importance, compliance among nurses in the ED is often inconsistent due to time constraints and high patient acuity. This project evaluates current practices in the ED, reviews existing literature on hub contamination and disinfection, and implements an educational intervention emphasizing proper scrubbing technique. Evidence demonstrates that proper hub disinfection can drastically reduce bacterial contamination. This project aims to improve nurse compliance, enhance patient safety, and reduce preventable infections associated with peripheral IV use.

# Preventing Delirium in Hospitalized Cardiac Older Adults

**Kristina Kim**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 97

**Abstract:**
The purpose of this capstone project is to examine evidence based nursing interventions aimed at preventing delirium in hospitalized older cardiac adults. Nurse led prevention strategies focus on early identification of risk factors and the implementation of targeted nonpharmacological interventions to improve cognitive and functional outcomes. The relationship between structured nursing prevention measures and reduced delirium incidence in older cardiac patients will be explored.Clinical observations on the telemetry unit showed a high prevalence of postoperative confusion, functional decline, and prolonged recovery among older adults at risk for delirium. These findings showed that prevention practices were not consistent, especially in managing sleep problems, limited movement, sensory issues, and the use of high risk medications. Such observations supported the need for improved nursing approaches to delirium prevention.Current articles identify delirium as a common and serious complication in hospitalized older adults, with many cases considered preventable. Evidence supports multicomponent nonpharmacological interventions such as early mobilization, reorientation, hydration, sleep promotion, and sensory optimization as effective strategies to reduce delirium incidence and improve patient outcomes. This project highlights the need for standardized, nurse led prevention protocols to support recovery, reduce complications, improve care quality, and lower healthcare costs in older cardiac patients.

# Nurse-Led Early Palliative Care: Improving Resource Use and Reducing Nurse Distress

**Colin Kimball**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 98

**Abstract:**
This capstone project provides early palliative care screenings on a postoperative orthopedic unit. The gap exists because nurses often confuse palliative care and hospice (Saraiya et al., 2025). This leads to "moral distress" when they feel as though they must perform aggressive or futile treatments on terminal patients who actually need comfort care (Di Cristofaro et al., 2025). Scientific evidence proves that early nurse-led screening is successful and easy to implement (Sato et al., 2025). This screening can reduce medical interventions, such as intubations and intensive care unit stays, by up to 88% (Lin et al., 2025). The screening checklist will be introduced as a tool to assist nurses in identifying patients' physical and emotional concerns early in their stay (Sato et al., 2025). The goal of this project is to empower nurses and patients by improving patient dignity and alleviating professional burnout by ensuring care aligns with patient values (Di Cristofaro et al., 2025; Babu et al., 2025).

# Evidence-Based Methods to Reduce Stress in Newborns During Heel Stick Procedures

**Cara King**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 99

**Abstract:**
The purpose of this capstone project is to address the need for consistent, evidence-based methods to reduce newborn stress and pain during heel stick procedures. Heel sticks are among the most frequently performed interventions seen on maternity units, and are unfortunately a significant source of pain and physiological stress for newborns. Evidence has shown that there are many different non-pharmacological methods that can be done prior to or during heel sticks that help reduce the amount of pain and stress newborns experience. In order to help educate the nursing staff on the clinical floor on these methods, a handout was developed that highlights six evidence-based techniques that a single nurse can use when performing a heel stick. This handout will serve as a quick, easily accessible reference for nurses on the unit to reduce newborn stress during these routine procedures, and ultimately promote consistent pain management, improve nurses' workflow, and enhance the overall quality of patient care.

# Understanding Care Choices: Palliative vs. Hospice in Advanced Illness

**Molly Knight**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 100

**Abstract:**
The purpose of this capstone project is to develop an educational poster to improve patient and family understanding of palliative care and how it differs from hospice. This project was chosen based on clinical experiences on a unit, where patients with tracheostomies, ventilator dependence, and advanced respiratory disease demonstrated significant symptom burden and frequent misconceptions that palliative care means “giving up.” The goal is to provide clear, accessible education that promotes informed, patient-centered decision-making and improves quality of life.Literature supports early integration of palliative care to enhance symptom management, communication, and alignment with patient goals, yet confusion with hospice persists. This project supports the future of nursing by strengthening the nurse’s role in patient education, improving communication, and promoting earlier integration of palliative care into practice.

# The Importance of PPE in the Emergency Department

**Caroline Krawec**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 101

**Abstract:**
In the emergency department, nurses are tasked with responding to time sensitive events while managing workflow responsibilities and delivering patient care. Although personal protective equipment (PPE) is often required, adherence to these standards is not consistent. Time constraints are the most reported barrier despite contradicting evidence-based guidelines. Findings indicate that donning proper PPE decreases exposure to infectious diseases, bodily fluids, and other hazards. At a medium sized emergency department, PPE usage was identified as a learning need. A literature review showed that proper PPE use supports safe, patient centered care by protecting both patients and staff alike. An infographic was created to reinforce the importance of proper PPE usage and compliance with evidence based practice standards. Strengthening PPE adherence will enhance nursing practice by promoting a safer work environment, reducing occupational risk and improving the overall quality of patient care.

# The Importance of Car Seat Education for Parents of Newborns

**Ava Laferrera**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 102

**Abstract:**
Motor vehicle accidents are a leading cause of infant injury and death, making proper car seat use essential for newborn safety. On a postpartum unit in Connecticut, nurses identified a learning need during discharge car seat checks, as many parents demonstrated incorrect positioning, loose straps, and uncertainty about installing car seats into their vehicle. Nurses are able to assess the car seat and provide education once prior to discharge and are not responsible for assisting with installation in the car due to hospital liability. This leaves limited opportunity for continued education and places responsibility on the parents. To address this issue, a patient handout was developed to support ongoing parent education and will hopefully become a routine part of discharge teaching. This resource is aimed at first time parents of newborns, improving confidence and promoting safe car seat practices after discharge.

# Strategies to Improve Medication Adherence in Patients with Chronic Illnesses

**Bridget Lain**

Faculty Mentor: Genevieve DaFonte

Egan School of Nursing and Health Studies

Booth: 103

**Abstract:**
The purpose of this capstone is to emphasize the importance of education of medication adherence for patients diagnosed with a chronic illness. Medication non-adherence leads to increased hospitalizations, poor health outcomes, and increased healthcare costs. Non-adherence to medication can be due to many different factors like financial concerns, inadequate patient education, and polypharmacy. This capstone reviews different evidence-based strategies to improve medication adherence for patients with chronic illnesses. The goal of this capstone project is to identify interventions to promote adherence and patient education. Some strategies for medication adherence include the teach-back method, use of pill organizers, and addressing any barriers to medication adherence. An infographic was made for this project as a handout to be given to patients at time of discharge. This infographic provides the patient with necessary information needed about their medication and diagnosis

Observations during this clinical rotation at our local hospital's general medicine unit revealed several patients with chronic illnesses unnecessarily hospitalized due to medication non-adherence. My observations were gathered from the patients, staff, and also from evaluation of discharge teaching.

# The Significance of Early Ambulation on the Post-Operative Patient

**Megan Landry**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 104

**Abstract:**
AbstractEarly ambulation is a key component of postoperative care and Enhance Recovery After Surgery (ERAS) protocols. Research consistently demonstrates that mobilizing patients within the first 24 hours after surgery improves outcomes, including reduced complications, shorter hospital stays, and increased functional independence. However, inconsistencies in protocol definitions and limited nursing education can hinder implementation. This project examines the impact of early ambulation across multiple surgical populations and emphasizes the critical role of nursing in promoting mobility. Evidence from recent studies shows that early movement improves recovery outcomes, decreases pain and complications, and enhances quality of life. Additionally, structured education for nurses significantly improves adherence to mobility goals. The project highlights the need for standardized protocols and effective patient education to optimize postoperative recovery. Keywords: Early ambulation, postoperative care, ERAS, nursing practice, mobility, patient outcomes, recovery, orthopedic surgery

# Improving Nurse Knowledge of Nifedipine as a Tocolytic Agent for Preterm Labor

**Alexa Lazazzera**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 105

**Abstract:**
Preterm labor is a leading cause of infant mortality in the United States and remains a significant public health concern. In 2022, approximately one in ten infants was born preterm, placing them at increased risk for respiratory complications, developmental delays, and long-term health issues. Effective management of preterm labor is essential in improving maternal care and neonatal outcomes. Although no medication can indefinitely prolong gestation, nifedipine is commonly used as a tocolytic to delay delivery for a short period. Despite its frequent use, gaps in nursing knowledge regarding its mechanism, administration, and monitoring persist. The purpose of this capstone project is to develop and implement an educational initiative for nurses on the use of nifedipine in the management of preterm labor, with the goal of enhancing knowledge, improving confidence in clinical practice, and promoting optimal patient outcomes.

# Promoting Improved Patient Outcomes Through Glycemic Control

**Kathleen Leonard**

Faculty Mentor: Dr. Michele Lecardo

Egan School of Nursing and Health Studies

Booth: 106

**Abstract:**
The purpose of this capstone project is to examine how controlled blood glucose levels influence wound and surgical healing time, and to evaluate whether improved glycemic regulation may decrease recovery time. A focused literature review was conducted examining glucose metabolism, insulin resistance, inflammation, and tissue repair mechanisms. I chose this topic because of its direct relevance to patient care, especially in surgical and medical-surgical settings where glycemic control significantly impacts outcomes as well as my own interest in the myriad of ways our glycemic index can impact our body. As a future nurse, understanding these connections is essential to providing safe, evidence-based care. This project also reflects the future of nursing in a positive way, emphasizing the growing role nurses play in prevention, patient education, and chronic disease management. The goal of this project is to deepen my understanding of glycemic control in healing and to highlight strategies nurses can use to optimize recovery. Ultimately, this work aims to support improved patient outcomes through proactive, informed nursing interventions.

# The Importance of Aseptic Technique and Microbial Capping During Peripheral IV Access

**Edna Lopez Recinos**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 107

**Abstract:**
It is common for patients in medical-surgical units to have peripherally-inserted intravenous (IV) catheters for procedures like medication or fluid administration. Breaks in aseptic technique during access to these lines, through the contamination of saline flushes or inadequate manual disinfection, increase the probability of catheter-related bloodstream infections. Consequently, patient safety and clinical outcomes are negatively impacted. This capstone project emphasizes the importance of targeted nursing education through evidence-based tools for improved adherence to infection prevention protocols. Strengthening competency in IV access management reduces infection rates, decreases hospital length of stay, and reinforces high-quality, safe nursing care.

# Pneumonia Prevention in Stroke Patients using Effective Oral Care

**Gillian Lorenzi**

Faculty Mentor: Jennifer Balzi

Egan School of Nursing and Health Studies

Booth: 108

**Abstract:**
The purpose of this capstone project is to educate nurses about the importance of effective oral care with stroke patients in preventing pneumonia. Observations on a neurological unit revealed that oral care was often not prioritized for stroke patients. To address this gap, an educational handout was developed for nurses to provide clear guidance on oral care materials, techniques, and frequency. The handout serves as a quick-reference tool to support consistent and evidenced based practices in busy clinical settings. Evidence indicates that stroke patients are at increased risk for pneumonia due to stroke-associated impairments. Research also demonstrates that effective oral care reduces oral pathogens and improves patient outcomes. This project emphasizes the importance of prioritizing oral care to enhance outcomes for stroke patients while reducing preventable complications such as pneumonia.

# The Importance of Patient Education on Ileal Conduit Care

**Meghan Lowinger**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 109

**Abstract:**
The purpose of this capstone project is to highlight the need for education prior to discharge for patient's with an ileoconduit on a large-scale General Surgery unit at an urban Connecticut hospital. Patients seen were overwhelmed by the information, and it was difficult for them to access the knowledge and resources needed to retain it prior to leaving the hospital. The goal of a discharge chestlist is to leave the patients with a list of resources they can take with them post-discharge, in addition to step-by-step instructions on how to care for their stomas, their purpose, and warning signs of infection. This checklist will help retain knowledge and act as a guideline for their first few months with an ileoconduit.
Observations on the General Surgery unit showed that educational tools were underutilized, in addition to a lack of attention towards issues like negative body image due to large physical changes. Online research conducted showed full rehabilitation can be achieved, with good quality long-term results, but a life dependent on an appliance has inescapable problems. It needs understanding and enthusiasm from the patient (British Medical Journal, 1978). A lack of enthusiasm, as observed, typically came from a lack of understanding. After taking time to speak to the patient, allow them to ask questions, and educate them on the misconceptions, the patient begins to embrace the change. Studies showed that enhancing acceptance may improve adjustment and prevent [body image] distress, improving well-being and self-efficacy (Muzii et al., 2024).
Effective discharge education is essential to patients leaving with an ileal conduit. Any lack of clear, accessible information will result in the patients feeling overwhelmed, negatively about their bodies, and therefore lead to a high risk of physical issues arising. Implementation of a checklist will not only familiarize the patient with these changes, but it will also give practical guidance, reinforce learning, and give access to resources and support in the community after leaving the hospital.

# Enhancing Nursing Recognition of Early Post-Operative Respiratory Deterioration

**Joseph Lucenti**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 110

**Abstract:**
Post-operative pulmonary complications are common and preventable issues that can lead to longer hospital stays and worse patient outcomes. Respiratory deterioration often develops gradually, and early signs such as changes in respiratory rate, increased work of breathing, and subtle clinical changes may be missed before oxygen saturation declines. Nurses play a key role in identifying these changes, but assessments may focus mainly on oxygen saturation. This capstone project focuses on improving early recognition of respiratory deterioration in a medical-surgical unit through a brief education intervention and a respiratory assessment tool designed to support timely intervention and improve patient safety.

# Importance of Non-pharmacologic Methods to Promote Sleep in Healing Patients

**Chloe Manasier**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 111

**Abstract:**
Sleep disturbances and poor quality sleep are common issues among hospitalized patients and can negatively impact healing, recovery, and overall patient outcomes. On a medical-surgical unit at a hospital in an urban setting, multiple patients reported poor sleep and a lack of awareness regarding available sleep-promoting resources on the unit. A literature review was conducted to explore alternative methods to promote sleep without pharmacological intervention. Findings indicate that strategies such as sleep masks, earbuds, lavender spray, and chamomile tea can safely improve sleep quality while minimizing medication-related risks. In response, a patient-centered handout was developed and distributed on the unit, outlining these accessible interventions and encouraging their use. This tool provides patients with easy-to-reference options to improve rest and supports patient involvement in their care. This resource aims to improve patient healing and comfort, with the goal of incorporating non-pharmacological sleep education into routine patient teaching.

# Reducing Opioid-Induced Respiratory Depression (OIRD): PCA Pump Safety Initiative

**Ava Marino**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 112

**Abstract:**
Patient-controlled analgesia (PCA) is commonly used to manage acute pain, especially in post-operative patients. While effective, PCA use carries significant risks, particularly opioid-induced respiratory depression (OIRD), which can lead to severe complications or death if not recognized early. This project focuses on improving patient safety by identifying high-risk patients through a standardized screening tool and enhancing nurse awareness of early warning signs. By implementing evidence-based interventions such as continuous monitoring, risk stratification, and staff education, this initiative aims to reduce adverse events and improve patient outcomes.

# Improving Infection Prevention Through the Use of Chlorhexidine (CHG) Wipes in Hospitalized Patients

**Jane Matthews**

Faculty Mentor: Laura Conklin

Egan School of Nursing and Health Studies

Booth: 113

**Abstract:**
This capstone project focuses on educating nursing staff on the evidence-based use of chlorhexidine gluconate (CHG) wipes to prevent healthcare-associated infections (HAIs), including central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), and surgical site infections (SSI). During clinical experiences, inconsistencies in CHG bathing practices and gaps in nursing knowledge were observed. Current evidence supports CHG bathing as an effective intervention to reduce microbial skin colonization and decrease infection rates (Huang et al., 2013). This project aims to enhance nursing knowledge, improve compliance with CHG protocols, and promote patient safety through standardized education and practice.

# Benefits of Integrated Smoke Evacuation Systems in Electrocautery

**Grace McCormack**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 114

**Abstract:**
Electrocautery devices are commonly used in surgery to generate high-intensity heat for precise tissue dissection. These electrically powered instruments release smoke into the operating room environment. The fumes contain harmful volatile organic compounds (VOCs) linked to asthma, cardiovascular disease, and other health conditions. An integrated smoke evacuation system (SES) is an attached apparatus that captures contaminants at the cauterization source. By reducing airborne particulate matter, they restrict the amount of harmful material inhaled by surgical staff. Despite availability, SES adherence remains low due to cumbersome equipment, noise level, and limited awareness of health risks. Unit-based education on the benefits of integrated SES may improve compliance and lower associated health hazards. This project aims to educate perioperative nurses at a 305-bed CT teaching hospital on the importance of integrated SES in order to increase utilization and promote safer operating room environments.

# Nutrition in Dementia Patients: The Importance of Individualized Meal-Time Interventions

**Maggy McEnaney**

Faculty Mentor: Michele Lecardo

Egan School of Nursing and Health Studies

Booth: 115

**Abstract:**
The purpose of this project is to educate nurses on meal-time interventions to increase oral intake in hospitalized patients with dementia. On a medical-surgical floor at a large urban hospital, patients with dementia showed negative outcomes from inadequate nutrition. A learning need was identified as nurses struggled to intervene effectively. Malnutrition is a prevalent issue for patients with dementia due to factors related to the disease process including dysphagia, reduced appetite, and behavioral change. Because increased calories and protein are essential during times of illness and injury, malnutrition hinders the healing process of hospitalized patients. Providing mealtime interventions geared toward the individual needs of the dementia patient can help combat this. Therefore, a handout was created to provide nurses with a variety of evidence-based interventions to increase oral intake in dementia patients and ultimately improve overall patient outcomes.

# De-Escalation of Neutropenic Precautions: Evidence Based Infection Prevention in Neutropenic Patients

**Emily McHugh**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 116

**Abstract:**
This project aims to investigate research related to infection prophylactic measures in patientsexperiencing chemotherapy-induced neutropenia while addressing the need to challenge outdatedprotocols. Although many of the protocols frequently used lack evidence to support their infectioncontrol measures, strict isolation, visitor limitations, and neutropenic diets are widely employed intoday's practice. Additionally, the use of prolonged and extensive isolation precautions has been foundto have a detrimental effect on patients' mental health by raising feelings of anxiety and hopelessness.Recent studies emphasize the importance of a patient-specific approach, incorporating risk-basedstrategies that prioritize patient education, symptom assessment, and proper hand hygiene for nurses.This project addresses the nurse's role in providing evidence-based care, educating patients, andpromoting a holistic plan of care that enhances both quality of life and safety.

# Improving the Consistency of Early Ambulation on an Orthopedic Inpatient Unit Through Nursing Practice Strategies

**Benjamin McKeon**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 117

**Abstract:**
Early ambulation following orthopedic surgery has been shown to improve patient outcomes, including reducing complications, improving functional recovery, and decreasing hospital length of stay. Despite these benefits, early ambulation is not always implemented consistently in clinical practice. Nurses often face barriers such as limited time, staffing challenges, and patient-related concerns that can delay early mobility.This project reviews current research on early ambulation in postoperative orthopedic patients and focuses on practical nursing strategies to improve consistency in early mobility. Studies show that early ambulation is associated with decreased 30-day mortality, improved long-term independence, reduced risk of deep vein thrombosis, and shorter hospital stays. Additionally, nurse-driven early ambulation initiatives have demonstrated improved discharge outcomes and recovery.By addressing common barriers and promoting nurse-led strategies, early ambulation can be implemented more consistently and effectively. Improving early mobility practices may enhance patient outcomes, reduce complications, and support faster recovery for postoperative orthopedic patients.

# Identifying Risk Factors for Patient Violence in the Emergency Department

**Anna Meaden**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 118

**Abstract:**
Workplace violence in the emergency department (ED) is a growing concern that affects the safety of healthcare workers, particularly nurses who frequently have direct and prolonged contact with patients. Due to the fast-paced and high-stress environment of the ED, patients may present with medical, psychological, or situational factors that increase the risk of aggressive or violent behavior. The purpose of this project is to identify common risk factors associated with patient violence in the ED and examine strategies for early recognition by healthcare staff. A review of current literature was conducted to explore factors that contribute to violent incidents, including substance intoxication, psychiatric illness, long wait times, and previous history of violence. Understanding these risk factors allows nurses to better anticipate potential violent behavior and implement appropriate interventions. Early identification and awareness can enhance overall safety within the department.

# Oral Care in Hospitalized Patients: Preventing Infections and Improving Patient Outcomes

**Abigail Menzel**

Faculty Mentor: Laura Conklin

Egan School of Nursing and Health Studies

Booth: 119

**Abstract:**
During my transition clinical rotation working with veterans, the nursing staff, my preceptor, and I identified a gap in oral care practices among hospitalized patients. After reviewing scholarly articles, it was revealed that there were deficits in both familiarity and the implementation of oral hygiene among patients and hospital staff. To address this issue and promote patient safety, improved outcomes, reduced infection rates, and boost patient education, I developed an infographic to support oral hygiene habits. The infographic is designed to be used alongside oral care supplies, such as a toothbrush, toothpaste, and chlorhexidine, to encourage patient participation. Poor oral hygiene can lead to hospital-acquired infections, including pneumonia, oral and systemic complications, and negatively impact one's self-esteem. This educational tool explains the importance of oral care, outlines possible risks of neglect, provides simple guidance on when and how to perform oral hygiene, and encourages patients to seek assistance when needed.

# The Importance of Nurse Education on Condom Catheter Care and Placement to Prevent Skin Breakdown

**Alyson Moore**

Faculty Mentor: Cara Tietjen

Egan School of Nursing and Health Studies

Booth: 120

**Abstract:**
External catheters frequently used as an alternative to indwelling urinary catheters in patients without urinary retention to lower the risk of catheter associated urinary tract infections, urethral trauma, and improve comfort level. While external catheters are often beneficial for patient care, they also have multiple risks including leakage, skin irritation including abrasions, and risk of urinary tract infections. This project focuses on the education of nurses surrounding condom catheter care and placement to prevent skin breakdown. After observing an Ortho/Neuro/Stroke floor at a community hospital, significant population of patients were noted to have external catheter devices. While providing patient care, many of the patients on the unit who had external catheter devices had devices that were improperly placed, dislodged, or not changed immediately when soiled. This places patients at higher risk for skin breakdown, especially in patients with preexisting pressure injuries on the coccyx and sacrum. The literature on the prevalence of external catheters and impaired skin integrity supported personal clinical observations and assessments. Additionally, the literature on skin breakdown clearly outlines the importance of preventing moisture exposure, particularly in preventing pressure injuries. This project serves to educate nurses on the proper application and maintenance of condom catheters to prevent leakage, which will prevent prolonged exposure to moisture and decrease patient risk for skin breakdown and pressure injury.

# The Importance of Canine Therapy to Improve Emotional Well-Being in Inpatient Older Adults

**Madison Muoio**

Faculty Mentor: Jessica Marraffa, Jenna LoGiudice

Egan School of Nursing and Health Studies

Booth: 121

*This research was also presented at the National Student Nurses Association Convention 2026 (Houston, TX)*

**Abstract:**
The older adult population, aged 65 and older, makes up a significant portion of hospitalizations throughout the United States and continues to grow at a rapid pace. For this cohort, hospitalizations can be a stressful and anxiety-inducing experience. Due to physiological changes associated with aging, pharmacologic therapies often place older adults at increased risk for adverse effects. Nonpharmacologic interventions serve as a complementary approach to support emotional well-being and mitigate the risks associated with polypharmacy. In particular, canine therapy is an evidence-based complementary intervention proven to improve sleep, reduce depression, enhance mood, and decrease anxiety during inpatient hospitalizations within this population. Observations on a medical-surgical unit located in a southern Connecticut hospital revealed a need to educate patients about this holistic therapy available during their hospitalization in order to have better utilization of the service. A literature review was conducted to explore the benefits of canine therapy in hospital settings, as well as effective strategies for educating patients on these findings to create a patient handout. Studies show that short-term interactions with dogs provide immediate improvement in anxiety and mood, and printed material helps facilitate retention. To meet this need, an infographic was developed to educate the hospitalized older adult on the availability, convenience, and effects of canine therapy.

# Workplace Violence in the Emergency Department

**Brooke Muzyka**

Faculty Mentor: Laura Conklin

Egan School of Nursing and Health Studies

Booth: 122

**Abstract:**
The purpose of this capstone project is to examine the need for improved workplace violence prevention strategies in the emergency department and to provide an evidence-based educational tool for nurses. Workplace violence remains a significant issue in healthcare, particularly in high-acuity settings such as the emergency department, where nurses frequently encounter aggressive patient behaviors.During my clinical experience, I observed multiple instances of verbal aggression and escalating patient interactions, and discussions with nursing staff revealed a consistent concern regarding safety and lack of easily accessible resources. These observations highlighted a gap in real-time support for nurses when managing potentially violent situations.The literature supports that workplace violence contributes to nurse burnout, decreased job satisfaction, and negative patient outcomes. Evidence also demonstrates that education focused on de-escalation techniques and early recognition of aggression can improve nurse confidence and reduce the severity of violent incidents. However, many existing resources are not practical for immediate use during patient care.This project focuses on the development of a concise, quick-reference educational tool designed to support nurses in recognizing and managing escalating behaviors. By providing an accessible and evidence-based guide, this intervention aims to promote nurse safety, improve therapeutic communication, and enhance overall patient care in the emergency department.

# Non-Pharmacological Pain Methods for Post-Operative Patients

**Caitlin Nickerson**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 123

**Abstract:**
At a mid-sized urban hospital in Connecticut, a gap was identified in post-operative pain management practices, with care primarily focused on pharmacological interventions such as NSAIDs and opioids. Patients frequently reported limited awareness of alternative options, while nursing staff demonstrated decreased utilization and advocacy for non-pharmacological strategies. Evidence supports that multimodal approaches, including guided imagery, relaxation techniques, and other supportive interventions, can improve pain outcomes and reduce reliance on medications. This project aimed to increase nursing staff awareness and use of these interventions through targeted unit-based education and the implementation of an evidence-based handout. Addressing this gap promotes safer pain management, enhances patient comfort, and supports a more holistic, patient-centered approach to care.

# Educating Maternity Care Providers on Trauma-Informed Care for Survivors of Sexual and Gender-Based Violence

**Elizabeth Norman**

Faculty Mentor: Kathryn Manfredo

Egan School of Nursing and Health Studies

Booth: 124

**Abstract:**
Sexual and gender-based violence is highly prevalent, yet trauma-informed care (TIC) is often not included in healthcare education despite its relevance (Montgomery & Duckworth, 2025). A learning need was identified during clinical experience on a maternity unit, where the intimacy of necessary assessments or procedures may trigger past trauma. Re-traumatization is the most common type of perinatal trauma (Long et al., 2024). Survivors may experience heightened fear and loss of control during the childbearing process and are at increased risk for adverse health outcomes such as depression, substance use, pregnancy complications, and preterm birth (LoGiudice & Beck, 2016). Survivors reported not being screened for abuse despite a desire to be asked about their history. This project recommends mandatory and optional extended training for staff, supported by evidence demonstrating improved provider attitudes toward TIC, saved time, and positive client responses sustained six months after training (Long et al., 2024).

# Bridging the Gap: Enhancing Nurse Competency of Breast Cancer Risk Assessment Models

**Deirdre O'Donnell**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 125

**Abstract:**
Breast cancer is the most diagnosed invasive cancer in the United States. Earlydetection of risk factors is essential to guide preventative strategies, includingchemoprevention and enhanced screening, such as breast MRIs andmammography. Risk can be estimated using validated models, including theTyrer-Cuzick and Gail. However, despite their clinical value, these tools remainunderutilized due to their complexity and limited familiarity among healthcareproviders, particularly nurses. This project addresses a critical learning need bydeveloping an educational poster to simplify the contents of these riskassessment models and their application in nursing practice. A review of currentliterature demonstrates gaps in knowledge and confidence, contributing toinconsistent use of these tools and missed opportunities for critical earlyintervention. By improving nurse understanding and confidence, this projectaims to enhance early detection, support interdisciplinary communication, andimprove outcomes in women's health.

# Enhancing Seizure Safety Through Effective Nursing Handoff Communication

**Anna O'Keefe**

Faculty Mentor: Jennifer Balzi

Egan School of Nursing and Health Studies

Booth: 126

**Abstract:**
Patients with seizure disorders are at risk for sudden, unpredictable events that require prompt intervention and a coordinated nursing response. Variability in individual patient seizure presentations, such as specific triggers, auras, medications, and postictal behaviors, highlights the essential need for clear communication between nursing staff to maintain patient safety. This learning need was identified on a neuroscience medical-surgical unit following an unstructured and incomplete handoff of an epileptic patient's seizure history and necessary precautionary measures. A literature review was conducted to investigate the significance of standardized handoff communication techniques and seizure safety measures in increasing seizure preparedness and preventing adverse outcomes. This prompted the development of a clear and concise nurse-to-nurse handoff communication tool that outlines individual patients' seizure information, including confirmation of current precautions in place and medication management. This tool aims to improve continuity of care during change-of-shift, ensure appropriate safety precautions are in place, and enhance nurse confidence in caring for patients at risk for seizures.

# Role of Tracheostomy Care in Reducing Risk for Aspiration Pneumonia  For Nurses

**Katelyn Paliwoda**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 127

**Abstract:**
Patients with tracheostomies are at an increased risk for respiratory complications, especially aspiration pneumonia. The purpose of this project is to educate and examine the role of proper tracheostomy care with a specific focus on reducing the risk for aspiration pneumonia. The goal is to highlight evidence-based nursing interventions that promote patient safety and prevent any complications. Observations during clinical on 9 North at St. Vincent's Medical Center revealed that the patient population included many with tracheostomies. After discussing with other nursing staff, it became evident that tracheostomy care is not always done as often or thoroughly as it should be done in order to successfully prevent infection. Current research and literature supports the importance of evidence-based tracheostomy care to reduce the risk for aspiration pneumonia. While many nurses are aware of the need for proper care, factors such as time constraints and other time consuming patients often gets in the way of consistent care. Implementing and reinforcing nurses of the importance of evidence-based tracheostomy care is an important step of improving patient centered care and putting patients safety at the highest priority.

# Improving Pain Management in Patients with Alcohol Use Disorder

**Celia Park**

Faculty Mentor: Michele Lecardo

Egan School of Nursing and Health Studies

Booth: 128

**Abstract:**
The purpose of this capstone project is to address pain management in patients with alcohol use disorder (AUD). The goal is to educate registered nurses on implicit biases, proper pain assessment techniques, as well as improve equitable, evidence-based pain management through staff education and patient resources. On my clinical floor, there are a large number of patients with alcohol use disorder who are often judged or misunderstood due to healthcare providers' own personal biases. Talking to these patients gave me a deeper understanding that they feel overlooked or judged, oftentimes leaving them mistreated or undertreated for their pain. The literature highlights the difference between implicit and explicit bias and how healthcare workers deal with it day to day. The literature also emphasizes how patients with alcohol use disorder often experience pain but they are often overlooked due to the stigma around AUD. There is an opportunity to educate nurses on the proper way to assess pain in patients with AUD and how to treat it.

# Factors Influencing Cardiac Diet Adherence Among Patients with Heart Disease

**Christina Pelgro**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 129

**Abstract:**
Cardiovascular disease is the leading cause of death globally and requires ongoing management through medication and lifestyle modifications, including adherence to a cardiac diet. If dietary recommendations are not followed, patients are at an increased risk for complications, hospital readmission, and poor health outcomes. On a telemetry floor in a mid-sized hospital setting, this issue was identified as a learning need and a literature review was conducted to futher explore contributing factors. Findings indicate that multiple influences, including patient education, socioecomonic barriers, cultural preferences, and low health literacy, impact adherence to a cardiac diet. A patient-centered food diary tool was developed to support dietary tracking and reinforce discharge education. This simple tool provides patients with a tangible way to monitor their intake, promote accountability, and encourage long-term adherence to dietary recommendations, ultimately improving cardiovascular outcomes.

# Central Line Associated Bloodstream Infections (CLABSI) Prevention Education for Nurses

**Marissa Petrucci**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 130

**Abstract:**
Central line-associated bloodstream infections (CLABSIs) remain a significant source of morbidity and mortality within the immunocompromised oncology patient population. The purpose of this capstone project is to provide education to oncology floor nurses and other staff regarding the prevention of CLABSIs. Inpatient oncology patients typically have numerous different risk factors for developing infections, such as malnutrition, neutropenia, and long-term central line devices that are frequently accessed by HCPs. A literature review was conducted to identify risk factors within the oncology patient population, as well as evidence-based prevention strategies such as central line management bundles and interdisciplinary audits and rounding. The findings of the literature review indicated that with continued education for nurses as well as standardized management bundles of central lines, CLABSI rates in oncology patients can be decreased, which increases patient safety and improves patient outcomes. Additionally, an educational flyer was created for nurses and other auxiliary staff on the unit. This infographic provides reminders regarding how to manage and access central line devices in an acute care setting.

# Enhancing Nurse-Driven Alcohol Withdrawal Management Through an Evidence-Based Care Bundle in a Veterans Affairs Step-Down Uni

**Olivia Petzold**

Faculty Mentor: Laura Conklin, Jenna A LoGiudice

Egan School of Nursing and Health Studies

Booth: 131

*This research was also presented at the National Student Nurses Association Convention 2026 (Houston, TX)*

**Abstract:**
Alcohol withdrawal syndrome (AWS) is a common and potentially serious conditionamong many hospitalized veterans, often resulting in acute complications such as delirium, over-sedation, falls, prolonged stays, and repetitive readmissions. The Clinical Institute Withdrawal Assessment for Alcohol, Revised (CIWA-Ar) is a symptom-triggered therapy widely accessed across institutions for medication administration (Sullivan et al., 1989); however, successful outcomes depend on consistent nursing assessment and careful integration of supportive interventions. Observation on a Veteran Affairs step-down unit revealed opportunities to enhance consistency, timeliness, and comprehensiveness of CIWA-Ar implementation, particularly through active structured nursing interventions and non-pharmacological initiatives that enhance patient comfort and safety.A review of the current literature demonstrated that structured nursing care andeducation, adherence to CIWA-Ar protocols, and supportive care measures, including hydrationmonitoring, sleep hygiene, environmental stabilization, and fall prevention, improve symptom control and reduce inpatient complications. In response to this, a nurse-driven alcohol withdrawal care bundle was developed to reinforce assessment dependability, standardize supportive interventions, and promote nurse autonomy within the scope of nursing practice. Thebundle aims to implement scheduled reassessments, environment modifications, hydration and sleep routines, supportive care strategies, and safety-focused interventions designed to optimize benzodiazepine administration and reduce the number of inpatient complications in conjunctionwith withdrawal symptoms.Implementation of this care bundle aims to enhance patient safety, improve consistencyin care, and demonstrate the impact of empowering nurse-led interventions within established V A protocols. This initiative can demonstrate how structured, nurse-driven interventions can support frontline nurses in delivering consistent, high-quality care to the veteran population experiencing acute alcohol withdrawal.

# Enhancing Simulation-Based Education to Improve Clinical Outcomes in First Year Nurses

**Sara Pham**

Faculty Mentor: Keri Webb

Egan School of Nursing and Health Studies

Booth: 132

**Abstract:**
New graduate nurses frequently encounter challenges transitioning from academic preparation to clinical practice, often demonstrating decreased confidence, limited clinical judgment, and increased risk for errors. This capstone teaching project addresses the learning needs of first year nurses by exploring the impact of enhanced simulation-based education on nursing and patient outcomes. Simulation provides a safe, controlled environment where novice nurses can practice critical thinking, decisionmaking, and technical skills without compromising patient safety. A review of current literature supports the effectiveness of simulation in improving clinical competence, increasing confidence, and reducing errors among new nurses. Based on these findings, an educational poster was developed to highlight the benefits of simulation and promote its integration into orientation and ongoing training for first year nurses. The project outlines the development process, including topic selection, evidence review, and creation of teaching materials tailored to the clinical setting. Enhancing simulation based education has the potential to improve patient safety, support nurse retention, and strengthen overall quality of care. This project emphasizes the importance of evidence based teaching strategies and their role in supporting the transition of new graduate nurses into competent and confident practitioners.

# Reducing Nurse Burnout Through Reiki Therapy and Mindfulness-Based Interventions

**Stephanie Ragusa**

Faculty Mentor: Dr. Katherine Saracino, Christin Lucia

Egan School of Nursing and Health Studies

Booth: 133

**Abstract:**
Nursing burnout presents a serious threat to nurses' health and quality of patient care, especially in medical-surgical units caring for an aging population. This capstone implements an educational tool introducing ways in which nurses can combat burnout. The use of Reiki therapy and Mindfulness Based Interventions (MBIs) help to reduce stress and promote well-being among nurses. Through the information provided on the infographic and through the implementation of structured programs, nurses learn evidence-based coping skills to help manage occupational stress, improve job satisfaction, and enhance mental and physical strength. The target audience for this capstone are all bedside nurses focusing specifically on high-acuity med-surg units who experience work-related physical, mental, and emotional exhaustion related to chronic stress and high patient-to-nurse ratios. Integrating self-care practices into the clinical setting aims to strengthen retention rates, increase fulfillment, and cultivate a supportive healthcare culture.

# The Importance of Timing Medication Administration to Prevent Alcohol Withdrawal Seizures

**Fiona Rauch**

Faculty Mentor: Michele Lecardo

Egan School of Nursing and Health Studies

Booth: 134

**Abstract:**
This capstone project aims to emphasize the importance of strict adherence to medication schedules to prevent seizures in patients withdrawing from alcohol (AWS). The goal is to educate nurses on prioritizing timely medication administration to reduce life-threatening complications, such as seizures, to improve patient outcomes. This topic was selected to address the learning needs related to challenges with time management and the impact of delayed medication passes in busy clinical settings. Review of the literature supports timely administration of benzodiazepines as first-line therapy to decrease central nervous system hyperactivity, with adjuncts such as phenobarbital when indicated. Evidence shows that non-adherence to these medications increases the risk of breakthrough symptoms, seizures, morbidity and mortality. This project can strengthen nursing practice by improving clinical judgment, enhancing patient safety, and promoting consistent, high-quality care for patients with AWS.

# Enhancing Caregiver Discharge Readiness and Education for Pediatric Patients with New Medical Devices

**Courtney Raymond**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 135

**Abstract:**
Across three medical-surgical units, the PICU, and NICU, a gap was identified in the lack of a standardized process to assess caregiver readiness and educate parents of children with new medical devices prior to discharge. Caregivers frequently expressed anxiety, uncertainty, and lack of preparedness when transitioning home. This gap in structured education can lead to missed teaching, improper device management, increased complications, and hospital readmissions.To address this need, a nurse-led discharge readiness checklist was developed to assess caregiver psychosocial readiness and hands-on skills while guiding education across shifts and improving communication among healthcare professionals. A mirrored caregiver checklist was also created to promote engagement and provide a clear, structured pathway to discharge.This project aims to increase communication regarding education progress for nurses and act as an assessment tool. It also aims to increase caregiver confidence, reduce anxiety, and support safe , effective transitions from hospital to home.

# Nurse Satisfaction With Scheduling and Staffing: Effect on Patient Care

**Grace Rehrer**

Faculty Mentor: Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 136

**Abstract:**
Nurse satisfaction with scheduling and staffing directly impacts patient care, particularly in high-acuity units such as orthopedic postoperative care. Staffing challenges, including understaffing andunnecessary call-ins, contribute to nurse fatigue, stress, and a perceived inability to provide optimalcare. During clinical observations on an orthopedic unit, nurses frequently reported feeling rushedand overwhelmed due to heavy patient loads and unpredictable scheduling. Upon literaturereviewevidence-based literature demonstrates that flexible scheduling, adequate staffing ratios,and supportive work environments improve nurse satisfaction and enhance patient safety. Thisproject highlights the critical connection between staffing practices and patient outcomes,emphasizing the importance of incorporating nurse input into scheduling decisions. To translate thefindings into a resource, an infographic was created for the orthopedic unit nurses. It summarizes theimpact of staffing and scheduling on nurse well-being and patient care, as well as strategies toimprove both.

# Modified Early Warning Signs

**Caroline Reid**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 137

**Abstract:**
The Modified Early Warning Score (MEWS) is a tool used to identify early signs of patient deterioration through routine assessment of vital signs and mental status. This project focuses on implementing MEWS to improve patient safety, enhance nursing assessment skills, and promote timely interventions. By standardizing communication and providing clear escalation guidelines, MEWS supports for better patient outcomes and quality of care. The project also emphasizes staff education to ensure proper use of the tool. Expected outcomes include earlier recognition of clinical decline, reduced adverse events, and improved patient outcomes, demonstrating MEWS as an effective strategy for strengthening patient care and clinical practice.

# Promoting Nursing Actions that Protect the Blood-Brain Barrier to Prevent Secondary Brain Injury After Stroke

**Peyton Rivers**

Faculty Mentor: Dr. Katherine Saracino, Christin Lucia

Egan School of Nursing and Health Studies

Booth: 138

*This research was also presented at the National Student Nurses Association Convention 2026 (Houston, TX)*

**Abstract:**
Following a stroke, nurses can manage complications and prevent secondary harm by reducing blood-brain barrier disruption, which directly benefits patient outcomes. The blood-brain barrier, referred to as the cerebral endothelial barrier, maintains neural homeostasis, crucial for preventing cognitive dysfunction or disease, especially after direct neurological harm. In post-stroke patients, timely monitoring and proactive interventions are not always consistently implemented by nurses, often due to knowledge gaps or limited awareness of how the care provided directly impacts blood-brain barrier integrity. In many settings, these protective actions are only carried out when specifically prompted by provider orders or protocols, rather than initiated independently by nurses. Nursing actions that prevent secondary damage by stabilizing the blood-brain barrier are associated with better neurological recovery and outcomes for stroke patients. Evidence suggests that monitoring of these parameters can also detect complications caused by the stroke earlier, including infection, hemorrhage, and systemic ramifications.Observations from a stroke-focused medical-surgical floor in a Southern Connecticut hospital revealed a need for more frequent monitoring for signs of cerebral endothelial barrier damage in stroke patients. A systematic literature review confirmed the harmful effects of uncontrolled blood pressure, glucose levels, and temperature in acute stroke management. If early signs are missed, patients face a greater risk of neurological deterioration due to increased intracranial pressure, cerebral edema, expanding infarct size, reduced treatment effectiveness, and higher mortality. As a result of this knowledge deficit, a tool was developed to educate nurses on the importance of early detection and prevention of further neurological harm. By integrating this support, nurses can be empowered to consistently monitor blood pressure, glucose, and temperature, advocate for their patients' needs, and actively influence outcomes through timely, evidence-based interventions.

# Induction of Labor Expectations in Nulliparous Women

**Carissa Ruocchio**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 139

**Abstract:**
The purpose of this capstone project is to develop a patient-centered educational resource for first-time mothers undergoing induction of labor. Clinical observations in hospital-based maternity unit showed that many nulliparous patients either lacked knowledge or developed misconceptions regarding the induction process, particularly the expectation of immediate labor progression and same-day delivery. Nulliparous patients oftentimes have limited prior exposure to obstetric interventions like labor induction, and variations in health literacy and educational background often contribute to misconceptions and expectations.Evidence-based literature explains induction of labor as a structured, stepwise process that often requires cervical ripening, pharmacological interventions, and prolonged and close monitoring. Inadequate understanding of the timeline and methods involved proved to lead to dissatisfaction with the childbirth experience, increased anxiety, and perceived lack of support from the nurses.This project aims to create a clear, teachable, and accessible patient education brochure for first-time mothers to improve understanding of the induction process, including the potential timeline, common interventions, and expected progression of labor. By promoting realistic expectations and providing anticipatory guidance, this resource aims to enhance patient satisfaction with the childbirth experience, reduce anxiety, and improve nursing communication, thereby enhancing patient-centered care.

# Improving Nurse Recognition of Caregiver Burnout and Education on Respite Care for Hospitalized Older Adults

**Lena Ryan**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 140

**Abstract:**
Caregiver burnout is a common yet often underrecognized issue in the inpatient setting, particularly among family members caring for hospitalized older adults. At a suburban hospital in Connecticut, caregivers of neurologic and orthopedic patients were observed remaining at the bedside for prolonged periods and demonstrating signs of stress and fatigue. Caregiver burnout can negatively impact caregiver well-being and the quality of care provided to patients (Ajithakumari & Hemavathy, 2022). The primary learning need identified was educating nurses on recognizing caregiver stress and providing early support. A literature review on caregiver burnout, self-care strategies, and respite care informed the development of an educational pocket card for nurses to distribute to caregivers exhibiting signs of stress. This intervention aims to promote caregiver self-care, prevent burnout, and improve patient care. The tool may support caregiver well-being and enhance patient outcomes on the unit.

# The Importance of Family Presence During Resuscitation in the Emergency Department: Educating Nurses on Best Practice

**Keira Savage**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 141

**Abstract:**
The purpose of this capstone project is to educate nurses on the importance of family presence during resuscitation in the Emergency Department. This topic focuses on how family presence can improve understanding and trust, as witnessing resuscitation efforts allows families to see that every possible measure is taken to save their loved one, while also highlighting the importance of assessing each family's emotional readiness.Traditionally, families were asked to leave during code situations, but there is now growing support for allowing them to stay as part of patient and family-centered care. Studies show that having family present can provide emotional support, increase satisfaction, and help with coping and grief without negatively affecting patient care when managed properly.This project highlights the role of nurses in ensuring the safe presence of family during resuscitation. By educating nurses on communication, emotional support, and appropriate assessment of families, healthcare teams can provide compassionate, patient-centered care while maintaining effective emergency treatment.

# Skin-to-Skin Contact and Its Effects on Neonatal and Maternal Health

**Caitlin Scacchetti**

Faculty Mentor: Dr. Katherine Saracino, Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 142

*This research was also presented at the National Student Nurses Association Convention 2026 (Houston, TX)*

**Abstract:**
The first hours to days after birth are a pivotal time for establishing maternal-infant bonding and supporting the health of both mother and newborn. One of the most effective ways to support this critical period is through skin-to-skin contact, also known as kangaroo care, a practice in which the newborn is placed directly on the mother's bare chest. This seemingly simple practice is often underutilized because many mothers are unaware of how to perform skin-to-skin contact or of its full range of benefits. Some mothers only engage in kangaroo care during breastfeeding or when prompted by nurses, such as when the infant is cold, rather than as a routine part of newborn care. This lack of skin-to-skin contact is significant because many mothers and newborns miss out on important physiological and psychological benefits that come with it. Research shows that kangaroo care promotes thermoregulation, stabilizes heart rate and breathing, supports early breastfeeding success, and fosters emotional well-being. For mothers, the practice enhances bonding, reduces stress and anxiety, increases confidence in caregiving, and supports postpartum recovery.

Observations on the Postpartum unit located in a southern Connecticut hospital revealed that skin-to-skin contact was inconsistently implemented, often due to a lack of maternal knowledge and limited staff guidance. Literature review and unit assessments confirmed the need for structured interventions to support both mothers and nurses in this practice. As a result, a tool was developed to guide nurses in educating mothers on the benefits of kangaroo care, including how to implement this practice. These interventions empower mothers to routinely engage in skin-to-skin care to ensure that infants and mothers receive the physiological and psychological benefits. By integrating this structured support, nurses can enhance maternal confidence, promote bonding, and improve overall postpartum care.

# Improving Inpatient Nurse Confidence in Managing Cardiac Arrest Emergencies Through Mock Code Education

**Jennifer Schiffel**

Faculty Mentor: Laura Conklin

Egan School of Nursing and Health Studies

Booth: 143

*This research was also presented at the National Student Nurses Association Convention 2026 (Houston, TX)*

**Abstract:**
In many hospitals, gaps in cardiac arrest emergency education contribute to decreased nurse confidence when performing life-saving cardiopulmonary resuscitation (CPR). With about 290,000 in-hospital cardiac arrest emergencies per year, it is essential that nurses demonstrate confidence, leadership, and effective teamwork when responding to these emergencies (Toft, 2023). The purpose of this capstone project is to evaluate the effectiveness of mock code simulations on inpatient nurses' education and preparedness when managing cardiac arrest emergencies. Observations on the Medical Step-down unit located in southern Connecticut revealed a need to deliver more frequent and structured mock code education, as staff expressed uncertainty regarding role assignment, CPR initiation/discontinuation, and use of technology. A literature review was conducted to further understand the learning need and search for a potential solution. To close this gap, it was recommended to implement more frequent in situ mock codes, in addition to online modules, to help nurses build confidence in their performance as a leader and team member. Evaluation methods include the use of rubrics and structured debriefs are used to identify what went well, where gaps may still exist, and make a plan for further areas of improvement. Increasing the frequency and realism of mock codes can enhance knowledge retention and build self-confidence during in-hospital cardiac arrest emergency situations.KEY WORDS: mock code simulation, in-hospital cardiac arrest, cardiopulmonary resuscitation (CPR), nurse confidence, knowledge retention, leadership

Learning Objective
Inpatient nurses will express an increase in confidence regarding their performance as a leader and team member during in-hospital cardiac arrest emergencies after implementing more frequent and realistic mock code education.

# Chemotherapy and Neutropenic Precaution Education for Oncology Patients

**Christine Schrempf**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 144

**Abstract:**
Oncology patients often develop neutropenia due to cancer treatment such as chemotherapy. When a patient's white blood cell count decreases, the body has little to no defense mechanism to fight off infection. Chemotherapy not only targets fast-growing cancer cells, but also healthy white blood cells. Consequently, it is essential for oncology patients to recognize the signs and symptoms of infection when their white blood cell counts are low (Neutropenia and Risk for Infection | Preventing Infections in Cancer Patients, 2025). To address this need, an educational handout was created to inform patients about precautions to take and what to avoid while their white blood cell counts are low. The goal of this project is to reduce infection rates and promote continuity of care.

# Understanding Opioid Use at the End of Life

**Ava Seibold**

Faculty Mentor: Jessica Marraffa

Egan School of Nursing and Health Studies

Booth: 145

**Abstract:**
Patients and families at the end of life often experience significant misconceptions regarding opioid use, including fears of addiction, hastening death, and over-sedation. These misunderstandings can lead to hesitation or refusal of pain medication, resulting in unmanaged symptoms and decreased quality of life. This capstone teaching project focuses on educating patients and families through the development of a clear, compassionate, and evidence-based brochure. The purpose of this educational tool is to address common concerns, provide accurate information about opioid use in end-of-life care, and promote understanding of comfort-focused treatment. Current evidence demonstrates that patient and family education improves understanding, reduces anxiety, and increases acceptance of opioid therapy. By enhancing communication and addressing common fears, this project aims to improve symptom management, support informed decision-making, and promote dignity and comfort at the end of life.

# Beyond the Baby Blues:  Recognizing and Addressing Postpartum Depression

**Caroline Shea**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 146

**Abstract:**
The purpose of this capstone project is to address the lack of recognition of postpartum depression compared to normal “baby blues” in postpartum patients. During clinical experience on a maternity unit, it was observed that many patients normalize symptoms of depression and delay seeking help. Literature supports that early identification and education significantly improve maternal mental health outcomes. This project focuses on providing a simple educational tool to help patients distinguish between baby blues and postpartum depression. Implementation of this tool can promote early intervention, improve patient outcomes, and support safe maternal-infant bonding.

# Dialysis Access Care: Promoting Education to Prevent Infection and Preserve Patient Outcomes

**Hannah Skalski**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 147

**Abstract:**
Caring for a dialysis access site does not end when the patient leaves the hospital, it continues at home, where proper patient education is essential to prevent complications. This capstone project was developed in response to observed gaps in education on a medical-surgical stroke and dialysis unit, where many patients reported insufficient instruction on how to care for their access site after discharge. The goal of this project is to improve patient knowledge and self-care practices through clear, evidence-based education.Lack of proper education increases the risk of infection, access failure, and hospital readmissions, highlighting the need for improved teaching strategies. Literature supports that “inadequate training…can lead to…infectious complications that can endanger patient safety” (Ma et al., 2020) and that “infection remains a major source of morbidity and mortality” in dialysis patients (KDOQI, 2024). Additionally, “effective patient education is crucial” in reducing these risks (Alikari et al., 2024).This project focuses on providing patients with the knowledge needed to safely care for their access site at home. By strengthening patient education, this project promotes safer outcomes and supports a shift toward prevention-focused nursing practice, ultimately improving the quality of care and reinforcing the nurse’s role in patient education.

# A Patient Guide to Incentive Spirometry

**Kaitlin Skinner**

Faculty Mentor: Cara Tietjen

Egan School of Nursing and Health Studies

Booth: 148

**Abstract:**
The purpose of this capstone project is to educate patients on why and how to properly use an incentive spirometer, particularly postoperative patients at risk for pulmonary complications. This topic was selected after observing that many patients on the unit were unsure how to use the device or did not understand its purpose. The goal of this project is to increase patient understanding and compliance through a flyer that clearly and concisely outlines each step for using the device. This project is also appropriate for the unit due to the high volume of postoperative patients who require this type of support. A review of current literature indicates that proper use of an incentive spirometer is associated with a reduction in complications such as atelectasis and pneumonia. Ultimately, this project aims to improve patient recovery, promote independence in care, and reduce preventable complications.

# The Importance of Adopting a Heart-Healthy Diet in Patients with Cardiovascular Disease

**Isabel Smith**

Faculty Mentor: Karianne Webb

Egan School of Nursing and Health Studies

Booth: 149

**Abstract:**
The purpose of this capstone project is to examine the role of nurse-led education in promoting a heart-healthy diet to prevent and manage cardiovascular disease (CVD). Effective patient education is essential in addressing modifiable risk factors and improving overall cardiovascular health outcomes. The goal of this project focuses on implementing evidence-based dietary strategies that nurses can use to educate and support patients in adopting sustainable lifestyle changes. Clinical observations at our local hospital's cardiac unit revealed a high prevalence of patients with risk factors associated with cardiovascular disease, including hypertension, hyperlipidemia, obesity, diabetes, and smoking. Informal patient interactions highlighted a limited understanding of how dietary habits directly impact heart health. These findings support the nursing diagnosis of knowledge deficit related to inadequate understanding of heart-healthy nutrition, as evidenced by poor dietary choices and uncontrolled risk factors. A review of current literature emphasizes the importance of dietary patterns, such as the Mediterranean diet, in reducing cardiovascular risk. While educational resources are available, materials that are simple, practical, and tailored to varying health literacy levels remain limited. This gap presents an opportunity for nurses to deliver clear, patient-centered, and evidence-based nutrition education. This capstone project provides an overview of accessible and evidence-based dietary recommendations to support cardiovascular health. The implementation of a standardized nurse-led education plan can improve patient knowledge, encourage healthier eating behaviors, reduce the risk of cardiovascular complications, and promote long-term health outcomes while decreasing healthcare costs.

# Reducing Postoperative Falls and Fall-Related Readmissions Through an Evidence-Based Discharge Intervention

**Kaylin Spinelli**

Faculty Mentor: Natalie Garcia, Dr. Jenna LoGiudice

Egan School of Nursing and Health Studies

Booth: 150

*This research was also presented at the National Student Nurses Association Convention 2026 (Houston, TX)*

**Abstract:**
Postoperative falls during hospital stays and after discharge are a significant contributor to preventable emergency department visits and hospital readmissions. Surgical patients are particularly vulnerable to falls due to mobility limitations, postoperative pain, medication effects, orthostatic hypotension, and new functional challenges during recovery. Targeted fall-prevention strategies are essential to promote safe recovery and reduce avoidable complications, especially on floors that care for a high volume of surgical patients.Observations on a med-surgical unit at a hospital in Southern Connecticut revealed a significant need to improve care related to postoperative falls and fall-related readmissions after discharge. The purpose of this capstone project is to examine risk factors associated with falls among postoperative patients and to develop an evidence-based discharge intervention to reduce fall-related readmissions. The project examines key risk factors such as hypotension, polypharmacy (particularly the combined use of opioids and antihypertensives), dizziness, weakness, and environmental hazards encountered during hospital admission and in home settings. Special attention is given to orthostatic hypotension related to rapid position changes and medication interactions that may significantly lower blood pressure. The project evaluates current discharge education practices and fall-prevention strategies to identify gaps in patient teaching, medication counseling, and follow-up care. Based on evidence-based literature, an enhanced discharge intervention will be developed, such as a standardized fall-prevention checklist and safety teaching guide focused on mobility precautions and blood pressure management. The proposed intervention aims to improve patient understanding, promote safe self-care behaviors, and ultimately reduce fall-related readmissions among postoperative patients.

# Reducing NIHSS Scoring Errors in Spanish-Speaking Patients Through Use of a Standardized Bilingual Stroke Scale

**Grace Stencel**

Faculty Mentor: Dr. Katherine Saracino, CJ Lucia

Egan School of Nursing and Health Studies

Booth: 151

**Abstract:**
The purpose of this capstone is to close gaps in stroke care for Spanish-speaking patients. The goal is to provide a standard Spanish NIHSS for units to ensure Spanish-speaking patients are assessed correctly while reducing errors. It was noted on a stroke unit that a patient who primarily spoke Spanish required hourly neurological assessments. During neuro checks, staff observed that the patient was unable to read the English NIHSS validation tool. When bilingual staff asked questions in Spanish, the patient answered correctly. This showed that without the bilingual nurse's help, the patient would have been scored incorrectly, which could have prolonged their hospital stay. The Spanish NIHSS will be a helpful tool for patients and nurses to help close the gap in misinterpreting deficits for recovering stroke patients. This tool will help prevent inconsistent scoring and widen nursing skills with bilingual patients.

# Preventing Accidental Tracheostomy Decannulation in Pediatric Patients

**Cailey Stockwell**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 152

**Abstract:**
Accidental tracheostomy decannulation is a serious and potentially life-threatening complication in pediatric patients, requiring rapid recognition to prevent airway compromise. This topic was identified through clinical experience and an interest in pediatric airway safety, highlighting a learning need for nursing staff to better recognize risks and implement prevention strategies. A review of current literature guided the development of a brief nursing in-service and a quick-reference infographic. The project focuses on improving awareness of risk factors, reinforcing safe tracheostomy care, and incorporating distraction techniques to reduce device manipulation. Increasing nursing knowledge and preparedness aims to enhance patient safety, reduce preventable complications, and improve overall outcomes in pediatric tracheostomy care.

# The Impact of Patient Education on Recognition of Early Warning Signs of CHF Exacerbation

**Isabelle Stottlemyer**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 153

**Abstract:**
The objective of this capstone project is to provide patients with the knowledge to effectively recognize early warning signs and symptoms of congestive heart failure. Observations on a cardiac/telemetry unit revealed numerous patient admissions for congestive heart failure exacerbations related to poor self-care behaviors due to inadequate symptom monitoring and knowledge. A patient handout on early warning signs such as weight gain, dyspnea, fatigue, and edema, was developed to increase recognition and mitigate hospitalization. A review of literature examined congestive heart failure patients' decreased ability to recognize changes in heart failure symptoms. Research supports deficient knowledge leads to poorer health outcomes, increasing hospitalization. This project emphasizes the importance of early recognition and intervention through patient education.

# Enhancing Maternal-Infant Bonding in the Neonatal Intensive Care Unit Through “Lovies”

**Lily Sullivan**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 154

**Abstract:**
The purpose of this capstone project is to examine the implementation of “Lovies” in the Neonatal Intensive Care Unit (NICU) as a nursing intervention to promote maternal–infant bonding. The primary target audience for this project is NICU nurses, who play a critical role in implementing and standardizing the use of Lovies within the unit. Mothers serve as a secondary audience, receiving education and support from nurses to safely engage in this intervention. Lovies are small fabric items, such as hearts or blanket squares, exchanged between the mother and infant to support sensory connection. The goal is to explore how this simple, evidence based practice can enhance attachment and improve the physical and emotional well-being for both mothers and infants during periods of necessary separation. Literatures support that scent-based interventions can enhance maternal-infant connections by improving the physiologic stability of the infant, while also promoting breastfeeding behaviors, increasing maternal milk production and reducing emotional stress. Clinical observations in the NICU revealed that many mothers lacked education about Lovies, and nurses had limited resources to offer as educational tools. Implementing education, such as infographics discussing the benefits of the intervention and how to properly use Lovies, in the high acuity environment helped to strengthen bonding, improve developmental and emotional outcomes, and empower parents to actively participate in their infant’s care.

# The Importance of Early Ambulation in Postoperative Patients in the Prevention of Deep Vein Thrombosis (DVT)

**Riley Sullivan**

Faculty Mentor: Dr. Katherine Saracino, Natalie Garcia

Egan School of Nursing and Health Studies

Booth: 155

**Abstract:**
It was identified that a 36-bed unit in Connecticut lacked postoperative ambulation, which is important for patient outcomes and reduced hospital stay. When patients lack postoperative ambulation, their risks of preventable complications arise, specifically risks associated with circulation such as deep vein thrombosis (DVT). When patients ambulate after surgery, there is increased circulation which promotes healing and recovery. The main learning need is to encourage the discussion, action, and education of postoperative ambulation on this unit. An infographic was created to encourage the nurses to ambulate their patients and educate them on its purpose and benefits. The hope is that this will become part of postoperative education on this unit and that more patients will be seen ambulating postoperatively.

# Improving Patient Education on Recognizing Stroke Symptoms

**Olivia Sweeney**

Faculty Mentor: Christina Cannone-Epstein, Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 156

**Abstract:**
The purpose of this capstone project is to summarize the educational plan and resources used by nurses to teach clients about recognizing and responding to stroke symptoms. It mainly focuses on the BEFAST acronym, in relation to quick EMS calls. The goal of nurse-led education is to provide clear, evidence-based guidance that helps all clients, particularly post-stroke patients, quickly identify stroke warning signs and take appropriate action. This project will also explore the relationship between nurse-led stroke education and its impact on timely intervention and improved patient outcomes. Observations during clinical, on the neuro/stroke hospital floor in Norwalk Connecticut revealed many patients have poor education on the recognition of stroke symptoms. Through informal conversations with patients about their understanding of stroke warning signs and emergency response, I was able to determine relevant nursing diagnoses for several clients. This unit demonstrated a knowledge deficit, as reflected by the high number of stroke patients on the floor. The majority of these patients did not immediately call EMS, due to them lacking understanding. The literature on the BEFAST mnemonic outlines the specific symptoms they can first experience. The evidence found on the language barrier for some stroke patients demonstrates its impact on timely recognition of symptoms and communication strategies. My educational tool expands its impact by supporting both English- and Spanish-speaking communities. This capstone project emphasizes the importance of providing clear, current, and accessible information to support nurse-led education on stroke recognition and response. The use of standard education helps increase awareness, lowers complications, and improves patient outcomes, which ultimately reduces stroke-related illness and death.

# Promoting Emotional Readiness During Tracheostomy Decannulation in Respiratory Care Patients

**Ella Tanis**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 157

*This research was also presented at the National Student Nurses Association Convention 2026 (Houston, TX)*

**Abstract:**
Tracheostomy decannulation is a key procedure in the management of respiratory care patients, creating a transition from dependence on mechanical ventilation to independent breathing. This transition is often seen as a physical recovery benchmark following severe patient conditions, but comes with great psychological impacts that cannot be undermined. Emotional and psychological stress, including anxiety, fear, resistance and vulnerability can complicate the decannulation process, with the potential of prolonging the recovery time and negatively impacting the patient's well-being overall. Observations from a Respiratory Care unit located in Southern Connecticut hospital revealed a need to monitor for signs of emotional distress including anxiety, resistance to the decannulation process, and a difficulty adjusting to life post-tracheostomy. Although the primary assessments of airway management and oxygenation are vital to the patient's well-being, emotional support and assessment are also key to recovery. When patients experience elevated stress and fear it can slow the recovery process. This project seeks to assess the impacts of emotional readiness interventions on patients who are undergoing tracheostomy decannulation. To meet this need, an educational tool that healthcare providers can utilize to support emotional readiness while educating patients about what to expect, how to cope with challenges, and mentally prepare for the process. The goal is to enhance emotional preparedness for the tracheostomy decannulation process to, in turn, enhance the physical recovery of patients, focusing on care of the whole person, rather than solely physical needs.

# Spinning Babies Supports Fetal Rotation and Improvement in Birth Outcomes

**Olivia Tedesco**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 158

**Abstract:**
The aim of this capstone was to explore the evidence-based Spinning Babies approach, a maternal positioning technique, and implement an educational flyer nurses can reference to guide positioning during labor. It was identified on a labor and delivery unit that nurses required additional guidance on positioning techniques at various stages of labor to support fetal rotation and improve birth outcomes. A review of the literature showed fetal malposition, such as occiput posterior, can result in prolonged labor and increased cesarean section rates, while Spinning Babies can promote fetal rotation, support physiologic labor, and reduce labor complications. Based on this data, an educational flyer was developed for nurses outlining information about the occiput posterior position, and recommended positions at different stages of labor, including visual aids and practical tips. Implementing this flyer will improve nurses' knowledge, confidence, and support these positions leading to improved maternal and neonatal outcomes.

# Non-Pharmacological Pain Management for Pediatric Oncology Patients

**Elizabeth Thibault**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 159

**Abstract:**
Pediatric patients with oncologic conditions frequently experience pain related to their diagnosis and medical procedures. Repeated exposure to pain can contribute to stress, anxiety, and fear during treatment. A review of the literature supports the combined use of pharmacological and non-pharmacological interventions to effectively manage pain in children with cancer. Evidence highlights distraction, cold application, vibration devices, and mind-body techniques as beneficial non-pharmacological interventions. An educational infographic was created to present this information in an accessible, family-friendly format for patient and caregiver use, promoting family participation and collaboration with the care team and ultimately supporting patient-centered nursing care.

# An Orientation to the ICU for Patient Families

**Alexandra Tomlinson**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 160

**Abstract:**
The families of patients in the ICU find the care their loved one receives complex, and the environment to be overwhelming and anxiety provoking. This is in part due to a lack of understanding of this setting and its happenings along with uncertainty of their loved one's condition. In an ICU in an urban hospital, patient family orientation to the ICU was established as a learning need, and this was further explored through a literature review. The reviewed research indicates that written information that familiarizes patient families with the ICU improves communication, understanding, patient outcomes. A pamphlet which overviews healthcare team members in this setting, common equipment, and common questions and concerns was created for patient families to utilize. Implementation of this would improve patient outcomes while reducing anxiety for families and improving satisfaction for patients, families, and providers.

# Improving Patient Understanding of Chemotherapy Side Effects and When to Seek Care

**Emery VanHeusen**

Faculty Mentor: Dr. Rose Iannino-Renz, Carolyn Previti

Egan School of Nursing and Health Studies

Booth: 161

**Abstract:**
The purpose of this capstone project is to educate oncology patients on when to seek care for chemotherapy side effects versus when to manage symptoms at home. The goal of this project is to provide patients and caregivers with information to support safe symptom management. Observations during clinical on an oncology floor revealed that many patients had questions about which chemotherapy side effects warrant a phone call to a provider. A review of literature supported these observations, demonstrating that patients often do not utilize resources before seeking emergent care for adverse effects. To address this learning need, an informational flyer was created to be distributed to patients upon discharge. This flyer outlines common chemotherapy side effects, symptoms requiring provider notification, and adverse effects that are an emergency and should be treated immediately. This capstone project reflects the importance of patient education in managing symptoms, reducing emergency department visits, and improving patient outcomes.

# The Importance of Improving Patient Understanding of Cardiac Telemetry

**Alexander Ventrella**

Faculty Mentor: Meagan Wilson

Egan School of Nursing and Health Studies

Booth: 162

**Abstract:**
The objective of this capstone project was to develop an educational tool for nurses and other healthcare professionals to help them educate patients on cardiac telemetry monitors. Cardiac telemetry devices are an essential healthcare intervention for continuous monitoring of patients' heart status, with the aim of early recognition to prevent life-altering heart complications. The goal was to present an evidence-based method for illustrating a complex topic in simplified terms, using an infographic education tool to make the information readily accessible and understandable to all patients. The literature demonstrates that cardiac telemetry education is vital for proper device use and is associated with optimal health outcomes. During clinical over the semester, it was noted that an urban hospital unit had a large population of clients on telemetry monitors. It was among the most frequent interventions seen in the cardiac telemetry unit. During multiple therapeutic conversations with patients, a trend emerged that helped identify a learning need. Knowledge deficiency related to the concept: they did not understand much about the device. Research was conducted to conduct a literature review and delve deeper into the manner. Data demonstrated the significance of educating patients about the issue, using the device correctly, and the effectiveness of infographics. Proper guidance and comprehensiveness will enable patients to maximize cardiac telemetry use, employing evidence-based practice to not only ensure they follow all instructions but also empower and encourage them to participate, be more motivated in managing their cardiovascular conditions, and strive to achieve the goals outlined in their individual care plans.

# Nursing Education of Intravenous Diuretic Administration Rates for Patients with Cardiovascular Disease

**Evah Waters**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 163

**Abstract:**
The purpose of this project is to educate nurses on the proper administration of intravenous diuretic medications to improve the clinical outcomes of patients with cardiovascular disease. A learning need was identified in the unit regarding clarification of medication administration guidelines, specifically when pushing frequently administered medications like diuretics. Diuretics are a type of medication that, when prescribed, must be given within a specific time period, as well as infused at a specific rate. Nurses contribute great effort in preventing medication errors, but even in these efforts, medication errors continue to be quite common in the inpatient setting. An educational tool was developed to clarify steps to take before administering medications, such as performing the five rights of medication administration and referring to hospital guidelines for administering specific medications, to improve standardization of medication administration and promote patient safety.

# The Importance of Education for Stroke Patients Starting an Anticoagulation Medication

**Morgan Watters**

Faculty Mentor: Cara Tietjen

Egan School of Nursing and Health Studies

Booth: 164

**Abstract:**
The purpose of this project is to better support post stroke patient's transition from an acute care setting to a home setting, a process that can be overwhelming for both patients and their families. The goal of the patient led education is to communicate the evidence-based methods for safe anticoagulation therapy in a manner that aligns with the patient's level of health literacy.An observation made during transition patient on an Ortho/Neuro/Stroke floor revealed that many patients were discharged without sufficient understanding and education about their newly prescribed anticoagulants. Conversations with both patient and their families about anticoagulation therapy revealed a severe knowledge deficit, increasing the risk of adverse effects and preventable readmissions. The literature reviewed indicates that targeted stroke specific discharge education significantly improves patient outcomes including medication adherence. However, resources available for lower health literacy levels are more challenging to identify within online searches. This gap highlights an opportunity for patient led education that enhances understanding of anticoagulation therapy and reduces the risk of recurrent stroke and related complications.

# Education on Nasogastric Tube Care at Home

**Rose Wegma**

Faculty Mentor: Tina Budd

Egan School of Nursing and Health Studies

Booth: 165

**Abstract:**
The purpose of this capstone project is to educate patients and their families on the nature and function of a nasogastric tube, provide guidance on its proper maintenance, and outline the appropriate steps to take in the event of tube dislodgement or removal. The goal of this education is to prevent complications, such as pneumonia, while also helping families save time and reduce costs by promoting safe and effective at-home management of the nasogastric tube.

While spending time on a pediatric medical-surgical floor, I noticed there was a large number of patients who were sent home with an NG-tube. After having conversations with several nurses and staff members, I developed a greater understanding of the knowledge deficit that families have about these medical devices. Often, children return to the emergency department due to nasogastric tube dislodgement or accidental removal, as caregivers may feel uncertain about how to safely replace the tube. This leads to increased stress and financial burden for families, while contributing to increased censuses in pediatric emergency rooms.

The literature has supported these findings, showing that many patients feel uninformed about what an NG-tube is and how they can sustain it while living at home. There is an excellent and valuable opportunity to enhance patient and family education, with the aim of reducing hospital visits. By improving an understanding of skills, caregivers can feel more empowered and become successful in managing nasogastric tube care at home.

# Improving Education for Family Members of Patients on Modes of Ventilation

**Hannah Whitmore**

Faculty Mentor: Dr. Rose Iannino-Renz

Egan School of Nursing and Health Studies

Booth: 166

**Abstract:**
The purpose of this capstone project is to educate family members of patients receiving different modes of ventilation. This topic addresses the need of adequate education not only for the patients, but also for the visitors, to understand complex respiratory interventions and treatments. This is needed to improve patient care and outcomes, whether they are receiving a non-invasive or an invasive mode of ventilation. While on a medical respiratory unit, visitors were unaware or undereducated on various treatments regarding ventilation. The teaching tool allows anyone accessing it to better understand respiratory interventions and patient conditions, promoting patient-centered-care and family-centered-care. This easy-to-use flowchart promotes inclusion of family members in patient care as well as a deeper understanding of patient status. Literature provides ample support of increased patient outcomes and family member outcomes when patients and family are included and educated on the care the patient is receiving. In the future of nursing, family members for patients receiving various common types of ventilation can utilize this tool.

# Emergency Department  Misuse in Pediatric Populations

**Elizabeth Zachary**

Faculty Mentor: Tina Budd

Egan School of Nursing and Health Studies

Booth: 167

**Abstract:**
A 230-bed urban children's hospital in Connecticut experienced numerous patients coming to their emergency department presenting with non-urgent medical issues. Internationally, studies estimate that 40-59% of pediatric emergency department cases could be effectively managed in a primary care setting (Montoro-Pérez et al., 2023). Nurses on our unit expressed the difficulties faced with wait times and resource allocation with a multitude of patients, especially with many having the potential to receive proper care from a different facility. Ensuring caregivers are properly educated on resources and facilities for various medical issues should be implemented as an in-person conversation with providers and a reference handout to reduce the amount of non-urgent cases being treated in the ED. Decreasing the number of non-urgent cases in the ED will allow improved efficiency for healthcare providers, ensuring that patients with genuinely emergent issues receive excellent, thorough care.

# The Role of the Operating Room Nurse: Using Therapeutic Touch to Reduce Anxiety During Anesthesia Induction

**Olivia Zak**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 168

**Abstract:**
Being a nurse–no matter the specialty, care setting, or patient population–means being a patient advocate. Nurses advocate for the physical and emotional well-being of their patients. This is especially true in the operating room, where patients are at their most vulnerable. Through this advocacy, the nurse plays a critical role in ensuring patient safety and enhancing patient outcomes. In the operating room, one such way nurses take on this role of patient advocate is through therapeutic touch during anesthesia induction. This project focuses on the benefits of hand holding and nurse presence during the induction phase. Evidence supports that hand holding during this phase of patient care lowers anxiety, enhances outcomes, and lowers the body's stress response. Through this simple gesture, nurses can make a meaningful impact on a patient's surgical experience.

# Protecting Newborns with Vitamin K

**Alexandra Zarkadas**

Faculty Mentor: Dr. Katherine Saracino

Egan School of Nursing and Health Studies

Booth: 169

**Abstract:**
Vitamin K deficiency bleeding (VKDB) is a rare but life-threatening condition in newborns caused by low vitamin K levels at birth. Without prophylaxis, infants are at risk for severe complications, including intracranial hemorrhage and death. On a maternity unit in Connecticut, a key learning need identified was a gap in parental education and understanding of vitamin K prophylaxis, contributing to hesitancy and refusal. This project was inspired by clinical observations of first-time parents expressing concerns about safety, side effects, and the necessity of the injection. An evidence-based literature review was conducted to examine the effectiveness of vitamin K prophylaxis and parental perceptions. An educational infographic was developed to be provided during admission to improve understanding. Enhancing parent education can promote informed decision-making and improve newborn health outcomes.

# SESSION II

## Capstone and Course-Based Projects

- Meditz College of Arts and Sciences
- Dolan School of Business
- Egan School of Nursing and Health Studies
- School of Education and Human Development

STUDENT RESEARCH SYMPOSIUM

# Personalized Healthcare Decision Support Using Multi-Outcome Predictive Modeling

**Andrew DeLaricheliere, Elias Bekdas, Harry Griff**

Faculty Mentor: Dr. Vishnu Vinekar

Charles F. Dolan School of Business

Booth: 55

*This research was also presented at the National Big Data Health Science Conference*

**Abstract:**
Our research looks into the effect that early specialist intervention and predictive modeling has on improving health outcomes and decision making of patients. The first component of our research examines a decision support framework for different musculoskeletal treatments. This model predicts multiple patient-relevant outcomes, such as long-term pain reduction, rehabilitation time, and costs. Our results show strong predictive accuracy on all outcomes and show meaningful tradeoffs between treatment intensity and patient outcomes.The second component of this examination revolves around how diabetes patients who see endocrinologists early experience reduced hospitalization rates, emergency visits, and healthcare costs within the first 12 months. The study uses logistic regression, gradient boosting, and proportional hazard models to analyze the impact of early specialist involvement on patient outcomes. Overall, our findings show that early intervention and personalized, multi-outcome prediction tools can improve clinical decision making by focusing on individualized care instead of population averages. This has significant implications for patients, healthcare systems, and insurers by allowing for more transparent and patient-centered treatment decisions.

# Balancing Pain, Recovery, and Cost: Using Predictive Analytics to Evaluate Patient Outcomes

**Samantha Gondelman, Libby Camardella, Jake Vaughan**

Faculty Mentor: Dr. Vishnu Vinekar

Charles F. Dolan School of Business

Booth: 56

*This research was also presented at the USC Big Data Health Science Case Competition*

**Abstract:**
Choosing between surgical and conservative treatment for musculoskeletal (MSK) conditions can be challenging for both patients and providers, as each option involves tradeoffs related to pain, recovery, rehabilitation time, and cost. Treatment decisions are often based on average outcomes, which may not fully reflect how individual patients experience care. This creates an opportunity to use data to better understand how different treatments impact patients in meaningful and personalized ways.The purpose of this analysis was to compare surgical and conservative care across five patient outcomes: short-term pain, long-term pain reduction, long-term functional improvement, rehabilitation time, and out-of-pocket costs. Rather than identifying a single best treatment, our goal was to highlight how outcomes differ across treatments to support more informed, patient-centered decision-making.We built predictive models for each outcome using baseline patient health data. Separate models were created for surgical and conservative care patients, and model performance was evaluated using standard validation techniques. We also examined which patient characteristics most strongly influenced outcomes in order to understand why treatment effects differ across individuals.Our results show clear tradeoffs between the two treatment options. Surgery leads to better long-term pain relief and improved functional outcomes, but it is also associated with more short-term pain, longer rehabilitation periods, and higher out-of-pocket costs. Conservative care, on the other hand, results in less short-term pain, shorter rehabilitation time, and lower costs, but offers smaller long-term improvements. Across all outcomes, basic health measures such as blood pressure, BMI, body temperature, and heart rate were consistently important, suggesting that healthier patients tend to recover better regardless of treatment choice.These findings suggest that treatment decisions should be guided by patient goals rather than averages alone. Patients who prioritize long-term recovery may benefit more from surgery, while those focused on short-term comfort, cost, and recovery time may be better suited for conservative care. By using predictive analytics to clarify these tradeoffs, providers can better support personalized treatment decisions and shared discussions with patients.

# How can Analytics help with our understanding of Heart Disease

**Justin Kaplan, Lindsay Butts, Jack Hart, Kathryn Young**

Faculty Mentor: Dr. Vishnu Vinekar

Charles F. Dolan School of Business

Booth: 57

**Abstract:**
Our group's presentation will detail our capstone project dedicated to an analytical approach at combatting heart disease. Using various advanced learning models we have begun to use multiple variables and derive which ones could potentially be indicators of heart disease. Our group strives to use this data in order to aid insurance companies, doctors and patients to gain a better understanding of cardiovascular disease.

# U.S. Auto Recalls and Portfolio Risk: A Data-Driven Framework for Financial Analysts

**Austin Margiela, Alex Novotny, Khang Dang**

Faculty Mentor: Dr. Vishnu Vinekar

Charles F. Dolan School of Business

Booth: 58

*This research was also presented at the Business Analytics Competition at Manhattan University*

**Abstract:**
Vehicle recalls in the U.S. personal auto sector have risen substantially on a per-vehicle basis since 2000, yet the portfolio implications of this trend remain poorly understood. This study develops a quantitative risk framework for financial analysts by integrating multiple government, institutional, and market datasets, including NHTSA recall records, consumer complaints, daily stock prices for major OEMs, financial statement data, and per-manufacturer U.S. unit sales from SEC filings, spanning 2000 to 2025. Using a market-model event study across thousands of recall events, we find that individual recalls produce no statistically significant abnormal stock returns, suggesting efficient market absorption of routine recall news. However, topic modeling reveals that certain recall categories, particularly fire and fuel system defects, generate meaningfully negative market reactions, while others show neutral or positive returns, indicating the market differentiates by recall type. Per-manufacturer normalization using unit sales data uncovers wide disparities in recall rates across manufacturers, with European luxury brands showing significantly higher rates per vehicle sold than mass-market leaders. A machine learning classifier predicts recall severity with strong accuracy using engineered features derived from recall text and historical patterns, offering a potential screening tool for portfolio risk assessment. Our findings suggest that recall volume alone is a misleading risk signal, and that recall category, manufacturer normalization, and consumer complaint ratios provide more actionable intelligence for auto sector investment decisions.

# Turning Data Into Firm Growth: Analytics, AI, and SME performance in Europe

**Matthew Nigro**

Faculty Mentor: Dr. Eileen Wilkinson, Dr. Dina Franceschi

Charles F. Dolan School of Business

Booth: 59

**Abstract:**
This capstone examines how big data analytics (BDA) and AI (artificial intelligence) boost the performance and competitive advantage of small to medium sized enterprises (SMEs) in Europe. These technologies have an incredible potential to grow firms with decision making, efficiency, and agility. This paper explains how, and why, some firms fail to adopt these technologies properly. It also examines how exactly European companies create value by transforming data into useful knowledge that improves operations. The factors that lead to a firm's success while implementing big data analytics and AI are examined throughout this piece. This study argues that analytics, and AI can significantly improve SME growth in Europe when properly implemented.

# A True Multi-Agent Agentic AI System for Real-Time Portfolio Management: Integrating Deep Reinforcement Learning, Open-Source Financial LLMs, and Macroeconomic Intelligence

**Sidharth Kumar Pradhan**

Faculty Mentor: Dr.Illya Mowerman

Charles F. Dolan School of Business

Booth: 60

**Abstract:**
Traditional portfolio management systems rely on static optimization models that fail to adapt to the rapid, nonlinear dynamics of modern financial markets, macroeconomic shocks, and the increasing influence of digital assets such as Bitcoin. This capstone project presents a fully operational, open-source True Multi-Agent Portfolio Management System, deployed as a live web application, that addresses these limitations through a coordinated ensemble of specialized AI agents operating within a unified LangGraph-orchestrated framework.The architecture departs from single-agent or dual-model designs by implementing a genuine multi-agent system with distinct, role-specialized agents: a Macroeconomic Intelligence Agent that continuously ingests and interprets real-time macroeconomic indicators and news; a Peer Sentiment Agent that analyzes financial discourse using open-source FinGPT and FinBERT models hosted on HuggingFace, eliminating costly proprietary API dependencies; a Risk Assessment Agent that monitors portfolio volatility, drawdown, and correlation dynamics; and a Portfolio Execution Agent powered by Deep Reinforcement Learning (PPO/TD3 algorithms) that synthesizes signals from all upstream agents to dynamically reallocate assets across equities, fixed income, and Bitcoin. Agent coordination is managed through LangGraph's stateful graph execution model, while CrewAI's role-based orchestration framework enables structured inter-agent communication and task delegation.A key design principle is accessibility: by grounding the qualitative analysis layer in open-source financial language models — specifically FinGPT (Llama-3 fine-tuned on financial corpora) and domain-adapted BERT variants — the system achieves institutional-grade natural language understanding without the cost barrier of commercial APIs. The system continuously learns from portfolio performance feedback, rebalancing strategies in response to evolving market conditions.Validated against benchmark strategies including equal-weight and traditional mean-variance portfolios, the system demonstrates superior risk-adjusted returns and adaptive resilience to macroeconomic volatility. The live prototype is accessible at aiagentportfoliomanager.streamlit.app and represents a pioneering contribution toward democratizing AI-driven investment management for retail investors.

# Evaluating International Expansion Opportunities in the Athletic and Footwear Retail Industry

**Kate Wrede, Alice Pifferi, Thomas Montella, Danielle Stamos**

Faculty Mentor: Dr. Vishnu Vinekar

Charles F. Dolan School of Business

Booth: 61

**Abstract:**
This capstone project develops a strategy to guide expansion decisions in the athletic and footwear retail industry by classifying markets into three categories: Invest, Stabilize, or Reduce. The model combines store-level performance data with economic, demographic, and social factors to evaluate market attractiveness and long-term retail potential across multiple countries. Across several phases, the model is improved by incorporating additional international datasets, creating new features, and adjusting variable weights based on expert research. Key economic indicators include GDP per capita, GNI, CPI, population, disposable income, and the Gini Index. These variables capture purchasing power, market size, inflation, and income inequality across global markets. A disposable income module further refines the model by incorporating income levels, growth rates, stability, and relative positioning within each market, making the analysis more focused on customer demand and future growth. The model also integrates industry research from retail and sports organizations to better reflect real-world trends such as participation rates, experiential retail, digital transformation, and competitive dynamics across global markets. All variables are standardized and combined into weighted scoring systems to generate final investment recommendations. Overall, this approach provides a clear and scalable method for evaluating international expansion opportunities in the athletic and footwear retail industry using both quantitative data and industry insights.

# Peer Earnings Call Sentiment and Firm-Level Return Predictability

**Sidharth Kumar Pradhan**

Faculty Mentor: Dr. Steven E. Kozlowski

Charles F. Dolan School of Business

Booth: 62

**Abstract:**
This study investigates whether the sentiment expressed in earnings conference calls by industry peer firms contains incremental information for predicting future stock returns at the firm level. Using natural language processing techniques to extract sentiment signals from earnings call transcripts, we analyze whether the tone conveyed by competitor firms during their earnings discussions can predict subsequent abnormal returns for a given focal firm. We find that peer earnings call sentiment is a significant predictor of firm-level returns, even after controlling for a firm's own earnings call sentiment and standard return predictors. These findings suggest that investors and analysts may underreact to information embedded in peer firm communications, creating exploitable return predictability patterns. Our results have implications for understanding information diffusion across firms within the same industry and contribute to the growing literature on the informational content of textual disclosures in financial markets.

# Social Justice Issues in China and India

**Jonathan Kuczik, Kyle Chase, Laura Barron, Elena DeBari**

Faculty Mentor: Dr. Mousumi Bhattacharya

Charles F. Dolan School of Business

Booth: 63

**Abstract:**
This report analyzes major social justice issues across global regions, focusing on workplace inequality, cultural influences, and human resource management implications. It examines four key cases: the caste system and women's insecurity in Southern India, migrant worker inequality and gender disparities in Northern India, labor rights violations and overwork culture in China, and the impact of the Hukou system on migrant workers in China. The analysis highlights how historical, political, educational, and economic factors contribute to persistent inequalities in each region.Findings show that systemic issues such as caste hierarchies, migration patterns, and restrictive policies continue to limit access to opportunities, fair compensation, and workplace protections. Cultural dimensions, including collectivism, power distance, and long-term orientation, further shape workplace behaviors and responses to inequality. These challenges significantly affect human resource management practices, including recruitment, training, compensation, performance management, and employee relations.The report concludes that multinational corporations must adopt ethical, inclusive, and culturally informed strategies to address these issues. Promoting fairness and equity is not only a social responsibility but also a critical factor in improving organizational performance, attracting talent, and ensuring long-term success in global markets.

# Organizational Justice and HRM in North Africa and Turkey

**Cody Read, Kaea Rangihaeata, Lily Back, Lila Ghize**

Faculty Mentor: Dr. Mousumi Bhattacharya

Charles F. Dolan School of Business

Booth: 64

**Abstract:**
This report examines workplace inequality across North Africa and Turkey, with a particular focus on gender inequality and its implications for human resource management (HRM). The region, including countries such as Egypt, Morocco, Algeria, and Turkey, has experienced notable improvements in education and economic development over recent decades (World Bank, n.d.). However, these advancements have not translated into equal employment opportunities, particularly for women (International Labour Organization [ILO], 2023).The purpose of this report is to analyze how historical, political, and economic factors contribute to inequality in the workplace and how these issues are reflected in HR practices. Using an organizational justice framework, the report evaluates fairness in outcomes, processes, and interpersonal treatment within organizations (Greenberg, 1987).The findings show that while access to education has improved significantly, especially for women, labor market outcomes remain unequal. Female labor force participation remains low, and women are underrepresented in leadership roles (World Bank, n.d.). HR practices such as recruitment, training, compensation, and performance management are often shaped by cultural norms, structural barriers, and informal systems that disadvantage women (United Nations Women, 2022).From an organizational perspective, these inequalities limit the ability of firms to fully utilize available talent and reduce workforce effectiveness. Issues such as lack of pay transparency, biased hiring processes, and limited advancement opportunities reflect broader problems of distributive and procedural injustice (OECD, 2023).The report concludes with recommendations for multinational corporations, including implementing structured recruitment processes, conducting pay equity audits, expanding leadership development opportunities for women, and introducing flexible work policies. Addressing these challenges can improve fairness, increase diversity, and enhance organizational performance.

# Southeast Asia Capstone Report

**Maura Rocco, Lillian Riley, Justin Eney, Tyler Reavis, Brian Emmons**

Faculty Mentor: Dr. Mousumi Bhattacharya

Charles F. Dolan School of Business

Booth: 65

**Abstract:**
Southeast Asia is growing at a rapid pace in terms of global economy, expecting to report a GDP growth rate of 4.7% in 2026. However, when scrutinized, factors like history, culture, and political landscape reveal the details behind its economy. When looking across countries like Indonesia, Malaysia, Vietnam, The Phillipines, and Singapore, each one is different but still share many key patterns when it comes to human resource management and workplace discrepancies. A major shared implication with great influence on this region is its history. Many ofthese countries were colonized at some point. Despite gaining independence decades ago, theyare still challenged with difficult economic and labor systems. Furthermore, there has been amajor push for development through ASEAN, helping Southeast Asia turn into a major hub formanufacturing and global businesses. However, even with such growth, there are still many gaps, creating inequality in the workforce as discussed within the different regions.Culturally, there are some clear similarities as many countries have a higher powerdistance, placing a strong respect for authority and hierarchy in the workplace. Furthermore,there is an emphasis on a collectivist attitude, meaning relationships and trust matter most. Thistends to present itself in things like hiring, where networking, referrals, and nepotism can be more important over qualifications. Such cultural factors also affect performance management due the focus on maintaining harmony rather than direct criticism.In terms of human resource management, several key trends are consistent. Forexample, recruitment is heavily relationship-driven, training is often used to fill skill gaps, andcompensation is primarily based on seniority instead of performance. Despite these approachespossibly working within the cultural context of the region, they can also create inefficiencies andInequality in the workplace. For instance, workers can become underpaid or overlooked simply because of their position in the workplace hierarchy or lack of network. A key takeaway is the role of social justice issues, specifically including migrant workersand workplace inequality. Across Southeast Asia, many economies rely heavily on their migrantlabor, creating a clear divide between local workers and foreign workers. This then leads tomajor concerns around distributive justice, where wages, benefits, and opportunities are notequally shared. There are also further concerns around procedural justice, where workers do not always have fair access to protections, legal systems, or grievance processes. Many times,migrant workers face high recruitment fees, unsafe working conditions, and limited ability tospeak up, which highlights broader issues of fairness and accountability in HR systems. Overall, Southeast Asia demonstrates that rapid economic growth does not necessarilylead to equal outcomes for workers. Instead, HR practices are influenced by history, culture, andpolitical systems, which can either reinforce or challenge ongoing inequalities. For companiesoperating in this region, it is

essential to understand these dynamics and create HR strategies that not only fit the local context but also promote fairness, transparency, and long-termsustainability.

# Southwest Asia Capstone Report

**Avery Spalter, Jane Kinney, Serena Mihalek, Michael Melillo**

Faculty Mentor: Dr. Mousumi Bhattacharya

Charles F. Dolan School of Business

Booth: 66

**Abstract:**
This research examines the intersection of social justice issues with human resource management in South and West Asia, with a specific focus on Saudi Arabia, the United Arab Emirates, Turkey, and Oman. By analyzing each country's history, political structure, education system, and economic conditions, we are now able to better understand the deep rooted factors that impact human resource management, the workplace practices, as well as inequalities. These background elements are critical because they each help to explain why certain human resource challenges exist, rather than identifying them on the surface level.A key part of this analysis is the culture, specifically through Hofstede's cultural dimensions, as they all highlight major differences, especially between these countries and the United States. Across the region, there is a consistent pattern of higher power distance, stronger collectivist values, and more relationship-based environments. This is crucial to understanding human resource management, as these traits influence how organizations operate, leadership styles, communication, and decision making. It is also important to note how these dimensions play a role in shaping how fair or unfair the workplace practices are perceived and experienced by employees.

Diving into the human resource management analysis in this region, the report focuses heavily on recruitment, training and development, compensation, performance management, and employee relations. Across all four countries, HR practices are heavily influenced by a combination of cultural expectations, government, and the economy. A major trend throughout our region is the heavy presence and impact of migrant workers. Within these dual workforces of nationals and migrants, there are challenges and major differences when it comes to fairness, compensation, treatment, and protection. Relationship based hiring and hierarchical management styles also can impact how opportunities are distributed and how employees are regularly evaluated.The most significant social justice issues identified in this report are gender inequality and migrant labor conditions. While progress has been made in recent years, particularly through initiatives such as Saudi Arabia's Vision 2030, there are still gaps in equality. Women across this region continue to face challenges and barriers when it comes to employment and leadership opportunities, as well as overall workplace participation to this day. At the same time, migrant workers very often are experiencing lower wages, limited protections, long hours, and unsafe working conditions, even though they are a critical part of the labor forces within the region. Overall, this report shows that while each country has its own unique context and influences, there are still strong similarities across the region in how inequality is embedded into the workplace dynamics. For multinational corporations, these inequalities serve as both challenges

and responsibilities that must be addressed on a daily basis. Organizations have to balance adapting to local cultural norms, as they vary country to country, while also maintaining fair and ethical HR practices. Addressing social justice issues is not only ethical, but also helpful for long term success and sustainability in the region.

# Managing People for a Global Business - South America

**Kathleen Vernon, Elli Mayock, Leonidas Protonentis, Anthony DeMartino**

Faculty Mentor: Dr. Mousumi Bhattacharya

Charles F. Dolan School of Business

Booth: 67

**Abstract:**
This research looks at South America through the lens of organizational justice and human resource management, with a focus on Brazil, Chile, Colombia, and Argentina. The goal of the research is to understand how historical, political, educational, and economic conditions shape inequality and how these conditions directly influence workplace practices. Across all four countries, common themes show including income inequality, labor informality, gender inequality, and regional disparities in access to opportunity. These structural issues create significant challenges for organizations, especially in areas such as recruitment, training, compensation, performance management, and employee relations.The analysis shows that each country has a unique context, but they are connected by similar social and economic pressures. Brazil faces deep inequality and a large informal labor market, which makes formal hiring and fair pay systems difficult to maintain. Chile has stronger institutions but continues to struggle with public demands for fairness, transparency, and reduced inequality. Colombia is shaped by its history of conflict and regional divides, which continue to affect access to education and stable employment. Argentina experiences recurring economic instability and inflation, which directly impacts wages, job security, and employee trust in organizations.Cultural factors also play an important role in shaping workplace expectations. Compared to the United States, these countries tend to place a stronger emphasis on hierarchy, relationships, and structured decision making. This influences how employees view leadership, fairness, and communication in the workplace. Hofstede cultural dimensions further highlight differences in uncertainty avoidance, power distance, and individualism, which affect how HR systems are received and understood by employees.From a human resource management perspective, organizations operating in this region must move beyond standard global practices and adapt to local realities. Effective strategies include skills based recruitment, structured performance systems, transparent compensation practices, and expanded training opportunities. These approaches help reduce bias, improve fairness, and support employee development in environments where inequality is already present. Social justice implications are central to the analysis. Distributive justice concerns arise from unequal access to pay and opportunity. Procedural justice is affected by inconsistent decision making processes. Interactional justice depends heavily on respectful communication and trust between managers and employees. Together, these factors shape how fair employees perceive their workplace to be and influence long term organizational stability.This report highlights that improving organizational justice in South America requires consistent, transparent, and inclusive HR practices. Companies that invest in fairness and employee

development not only improve internal outcomes but also contribute to broader social and economic progress in the region.

# Business Environments and Human Resource Management Practices in Sub-Saharan Africa

**John Volpe, Joseph Cunniff, Abigail Passarella, Cameron Turner**

Faculty Mentor: Dr. Mousumi Bhattacharya

Charles F. Dolan School of Business

Booth: 68

**Abstract:**
This research provides a comprehensive analysis of the business environments and Human Resource Management (HRM) practices across four pivotal Sub-Saharan African nations: Ghana, Kenya, Nigeria, and South Africa. By examining the intersection of economic drivers, cultural dimensions, and labor frameworks, this research identifies how multinational corporations (MNCs) can successfully navigate these emerging markets while addressing critical systemic challenges. The project specifically investigates how regional differences in infrastructure, political stability, and workforce readiness shape the strategy of global firms. By synthesizing data from West, East, and Southern Africa, the study highlights a collective narrative of high-growth potential tempered by volatility, where modern, formal industries coexist with massive informal economies. To operate ethically and successfully, the project concludes that MNCs must move beyond Western-centric HR models and adopt a localized approach. This requires prioritizing the formalization of labor to counter nepotism, actively bridging the gender pay gap through structured compensation audits, and investing in heavy "up-skilling" to address persistent skill gaps. By addressing these social justice issues, multinational firms do not just mitigate operational risk; they contribute to the sustainable socio-economic development of the region. Ultimately, success in Sub-Saharan Africa depends on a firm's ability to align its management practices with the unique cultural, economic, and institutional landscapes of these four diverse nations.

# Social, cultural, and economic factors for human resource management practices across European countries

**Matthew Walton, Simon Boresi, Kaetlyn L'Amoreaux, Christopher Santomero, Andrew Timpone**

Faculty Mentor: Dr. Mousumi Bhattacharya

Charles F. Dolan School of Business

Booth: 69

**Abstract:**
This project looks at how social, cultural, and economic factors influence human resource management practices across several European countries, including Belgium, Germany, France, the United Kingdom, and Poland. The purpose of this research is to analyze how differences and similarities within this region shape workplace behavior, organizational policies, and social justice outcomes. In particular, the project focuses on identifying a key social justice issue related to human resource management and evaluating its impact across different national contexts. We finf that history, culture, and economics easily shape how workplaces run in different countries. France, Belgium, Germany, the UK, and Poland all have strong labor laws and developed economies, but their unique histories and cultural values create different challenges for managing people. Across the region, one major social justice issue is inequality in employment for migrant and minority workers, which affects hiring, training, pay, promotions, and employee relationships. HR has to think about fairness in outcomes, processes, and everyday treatment to address these issues effectively. For multinational companies, the main lesson is that one-size-fits-all HR policies don’t work in Europe. Companies need to combine fair, standardized practices, like blind recruitment and transparent pay, with local cultural awareness.

# Comparing Platform-Driven Streaming Conversion from TikTok to Spotify in the U.S. and Indonesia: A Review Using the ADO-TCM Framework

**Gordon Anderson**

Faculty Mentor: Dr. Ruchika Sachdeva

Charles F. Dolan School of Business

Booth: 70

**Abstract:**
The rise of short-form video platforms has changed how music spreads around the world, but viral success on TikTok does not always translate into the same growth on Spotify in every country. This paper examines why TikTok appears to drive more Spotify listening in the United States than in Indonesia, even though Indonesia is one of TikTok's biggest markets. Using the ADO-TCM approach, it examines the conditions that affect whether people move from seeing a song on TikTok to listening to it on Spotify, such as streaming access, digital payment systems, and listening habits. Using Chartmetric data and case studies of artists, the paper compares TikTok-to-Spotify conversion rates in both markets, drawing on sources including Coulter (2022), Mallard (2023), Bubnova (2024), Akil et al. (2024), Tintiangko et al. (2023), and Shruthi Priya and Sathish (2024), among others. The findings show that TikTok virality does not automatically translate into Spotify growth, and that barriers such as limited access to premium subscriptions in Indonesia can reduce that conversion even when interest is high. Overall, the study shows that success on one platform does not always carry over to another, and that local market conditions play a major role in how music reaches listeners. Based on the review, the paper concludes with a future research agenda.

# In the Sovereigns' Shadows: Business Elites' Impact on a Multiplex World

**Nathalie Bates**

Faculty Mentor: Dr. Dina Franceschi, Dr. Lucrecia Garcia Iommi

Charles F. Dolan School of Business

Booth: 71

**Abstract:**
The increased influence that wealthy individuals have on global politics is concerning on several normative levels. At the same time, there is a lack of literature surrounding the role of wealthy individuals in global politics. The multiplex theory put forth by Amitav Acharya (2014) creates more space to analyze the roles of actors beyond states. With the incorporation of wealthy individuals' influence, this evolving theory has the potential to become the best framework for analyzing the progressing global order. Using case studies of several wealthy individuals, this paper argues that private individuals have significant impacts on global politics, ultimately agreeing with multiplexity but pointing out further areas where the theory needs expansion.

# Reform Without Results: An ADO Analysis of of Child Labor Persistence in Ghana and Côte d'Ivoire's Cocoa Sector

**Thomas Buckley**

Faculty Mentor: Dr. Ruchika Sachdeva

Charles F. Dolan School of Business

Booth: 72

**Abstract:**
Despite two decades of corporate pledges, certification programs, and sustainability initiatives, child labor in the cocoa-growing regions of Ghana and Côte d'Ivoire has not declined — it has worsened. This paper argues that this outcome reflects a structural design failure rather than inadequate effort. Using an Antecedents-Decisions-Outcomes (ADO) framework, it shows that the decisions corporations made consistently sidestepped the structural conditions driving child labor, not because those conditions were unknown, but because addressing them would require sacrificing margin and control. To address this issue, the paper offers a structured overview of the field's past and present state, helping researchers understand its breadth and depth. The literature review was based on an analysis of 40 articles from various sources. Evidence from the Harkin-Engel Protocol, third-party certification schemes, and industry spending records demonstrates that voluntary mechanisms systematically avoid the income floors, traceability mandates, and enforcement authority necessary for meaningful reform. The paper concludes that protecting children in West African cocoa supply chains requires a fundamental shift to legally binding accountability mechanisms.

# Fragmentation and Coercion: The Political Economy of Cartel Extortion and Government Crackdowns in Mexico

**Margaux Doran**

Faculty Mentor: Dr. Dina Franceschi

Charles F. Dolan School of Business

Booth: 73

**Abstract:**
This paper examines how cartel extortion and fragmentation shape economic activity in Mexico. Although cartel operations are undoubtedly disruptive, this paper argues that production and trade frequently continue alongside criminal control. Cartels embed themselves into legal industries through extortion, and use coercion to see profits while allowing production to continue. At the same time, government crackdowns often lead to fragmentation, causing cartels to reorganize rather than disappear. Multinationals respond to this by absorbing costs and remaining in these regions. As a result, economic activity persists, but value is redistributed, showing how criminal governance becomes embedded within Mexico's broader political economy.

# Mending Mining Relationships through proactive Social Management strategies

**Oliver McLaughlin**

Faculty Mentor: Dr. Dina Franceschi

Charles F. Dolan School of Business

Booth: 74

**Abstract:**
Current legal and social consequences from the mining industry's past actions provide a distinct opportunity for management to safeguard future relationships through the adoption of proactive Social Management practices. This paper highlights the past managerial failings of the mining industry using examples from the Northern Territory and Western Australia to expose the decisions that directly led to the destruction of culture and environment. Power, community relationships and internal governance must be addressed by leading firms to reflect best practices in a rapidly changing social and political climate.

# ESG, Firm Performance, and the Cost of Capital: Linking Sustainability to Valuation

**Meredith Spooner**

Faculty Mentor: Dr. Dina Franceschi, Dana Nugent

Charles F. Dolan School of Business

Booth: 75

*This research is affiliated with Climate, Coastal and Marine Studies*

**Abstract:**
This paper conducts a structured review on how environmental, social, governance (ESG) factors influence firm performance, the cost of capital, and ultimately firm valuation. Drawing on empirical evidence across various industries and regions to determine whether ESG improves long-term profitability, lowers the cost of equity and debt, and reduces perceived risk. The review highlights areas of empirical consensus, identifies conflicting findings, and outlines implications for companies, investors, and future research. Ultimately suggesting that ESG integration is not simply a reputational consideration but a financially material factor with measurable effects on investor expectations and long-term enterprise value.

# An Examination of Community-Driven Approaches to Well-Being and Independence in Older Adults

**Amelia McGreal, Amelia McGreal, Mary Rado**

Faculty Mentor: Dr. Tanika Eaves

Egan School of Nursing and Health Studies

Booth: 76

**Abstract:**
This study examines gaps in service awareness, accessibility, and unmet needs among older adults in Fairfield, Connecticut. Using survey data collected from senior residents, our findings reveal a lack of knowledge regarding available community resources, programs, and support services designed to promote well-being and independence. Participants consistently reported unmet needs across social, informational, and health-related domains, highlighting a disconnect between existing services and community awareness. Social workers play an important role in addressing these concerns, connecting seniors to available resources, and providing education on local resources.

# “In what ways are the story of Theseus and the Minotaur depicted in Athens versus other sanctuaries?”

**Dominic Chila**

Faculty Mentor: Dr. Andrew Ward

Meditz College of Arts & Sciences

Booth: 77

**Abstract:**
For my research project, I am going to present the appearances of the myth of Theseus insanctuaries, and the significance that they play. My research question would be, “In what waysare the story of Theseus and the Minotaur depicted in Athens versus other sanctuaries?” Thesespecific interpretations of the story, which is an Athenian myth, can be shown in different waysdepending on the temple that they are being displayed in. The myth, which is very famous,would have been displayed in Athens or places where Athens was trying to assert their influence on an international stage. I chose this topic with the help of Dr. Ward because I am veryinterested in ancient Greek mythology, and this class allows me to view some of the ways thatthese myths were displayed in the time they were being taught. A good place to start with thisresearch will be the Osborne reading and I will also have help from Christian’s presentation inclass. I am still in between on whether I will present a poster or write a research paper, but I feelthat either option will allow me to conduct a thorough investigation on the topic that will leaveme feeling proud and more knowledgeable.

# Sacrificial Practices Shaped Greco-Roman Sanctuaries

**Madelyn LaGiglia**

Faculty Mentor: Dr. Andrew Ward

Meditz College of Arts & Sciences

Booth: 78

**Abstract:**
The different types of animals, varying scales of sacrifices, and ritual procedures offered to different gods shaped the arrangement of spaces within sanctuaries in the Greco-Roman world. The Greco-Roman religion was expressed through ritual actions and in certain locations. Ritual practices are the actions that people do for the god, compared to abstract belief which is what people say and think about the god. The type of altars, ash layers, animal bones, sacrifices, and rituals in each sanctuary helped researchers understand who the god being worshipped was. Personality, power, and influence are what made each god differ from the other. The type of sacrifice reflected the god's personality and the physical settings showed the gods power and influence. For example, piglets were associated with Demeter and Persephone and were used in rituals for fertility. Material evidence shows how each sacred space was shaped by sacrifice. The placement of altars, and specific structures demonstrated how ritual determined how the spaces in sanctuaries were formed. Rituals require animals, processions, feasts, and fire because they are physical actions. Material remains of sacrifice showed evidence of what occurred for each tradition. Objects included animal bones, ash remains, terracotta figures, or monetary forms. Each was specific to the ritual gatherings. Civic identity was reinforced through large public gatherings and private gatherings, with both connected through the religious rituals and community. Expensive sacrifices were associated with elite civic displays and major public festivals. Sacrifices emphasize a lived religion because it is physical and geographical. Worshippers were killing animals, sleeping in sacred spaces, walking, and cooking in these sanctuaries. This concept connects ritual behavior to architectural space by using material evidence and not just mythological texts. Architecture was designed around ritual performance instead of abstract belief.

# Implications of Sanctuaries on Magna Graecia Culture

**Caroline McEvoy**

Faculty Mentor: Dr. Andrew Ward

Meditz College of Arts & Sciences

Booth: 79

**Abstract:**
This project examines how the architecture and spatial placement of sanctuaries in the Greek Cities of Paestum and Metaponto reflect shared views on religion, tradition, and culture in Magna Graecia, the colonies of southern Italy. Their sanctuaries commonly follow a general structure, like the Basilica in Paestum, and the Tavole Palatine in Metaponto, which use similar elements like Doric columns, cellae, and altars. The standardization between the city-states reveals the values and ideals that encompass Magna Graecia during this time. The comparison between the sanctuaries in Paestum and Metaponto's urban and extra-urban areas is a good indicator of how sanctuaries and, therefore, the culture, can shift depending on resources available and interactions between other cultures. The examination of the geographical placement of sanctuaries, their relationship to roads, other structures, statues, necropolises, and surrounding territories, strengthens the understanding of politics, practices, and cultural interactions. Special attention to how sanctuaries function not just as religious centers but also as cultural centers, markers of identity, territorial control, and cultural exchanges is extremely important in comparing the two city-states. Dissection of the differences between the aspects of the sanctuaries from the two city-states will reveal uniqueness, giving more clues into the specificity of the differing cultures. Through analysis of sanctuaries, the project highlights the ways in which sacred architecture serves as a focal point for social, political, religious, and cultural dynamics in Magna Graecia.

# The Cost of Glow: How Hypoxia Alters Bioluminescent Communication and Group Cohesion in the Flashlight Fish

**Adrianna Faraguna**

Faculty Mentor: Dr. Shannon Gerry

Meditz College of Arts & Sciences

Booth: 80

*This research is affiliated with Climate, Coastal and Marine Studies*

**Abstract:**
This project investigates how short-term exposure to hypoxia (low dissolved oxygen) affects bioluminescent communication and group cohesion in the flashlight fish, Anomalops katoptron. These fish rely on light produced by symbiotic bacteria housed in sub-ocular light organs to communicate, coordinate movements, and forage. However, this light production is energetically costly and dependent on oxygen availability. As coral reef systems increasingly experience hypoxic conditions, understanding how reduced oxygen disrupts communication in a species that depends on it is critical. Previous studies show that blink patterns and light use change depending on prey presence and darkness. This project adds oxygen stress as another factor. It is predicted that under low oxygen, fish may produce less light or change their blinking, which could affect how closely they school together. To study this, small groups of fish will be exposed to normal and 50% oxygen conditions in the lab, while high-speed video tracks their blinking and swimming. Additionally, oxygen recovery will be analyzed once oxygen levels return to normal. By connecting oxygen stress to communication and group behavior, this project helps to understand how environmental changes could affect social species on coral reefs.

# Testing the Effects of EE2 and BPA on the Social Transformation from Male to Female in Amphiprion ocellaris

**Kevin Wren**

Faculty Mentor: Dr. Shannon Gerry

Meditz College of Arts & Sciences

Booth: 81

*This research is affiliated with Climate, Coastal and Marine Studies*

**Abstract:**
Fish are the only known vertebrates to undergo hermaphroditism where they can change their sex or have both male and female gonads simultaneously. The reef fish Amphiprion ocellaris are native to South Asian and North Australian waters and are known to be protandrous hermaphrodites where the largest male will undergo a socially dependent sex change to female when a previous female is removed from the population. This change occurs within the endocrine system, as the hypothalamus-pituitary-gonadal axis will increase the amount of estrogen in the body to begin the feminization process in the largest male. Endocrine disrupting chemicals (EDCs) are anthropogenic chemicals that are known to interfere with the normal endocrine pathways in the body. Two widely known EDCs, EE2 and BPA, act as agonists to estrogen receptors in the body. This will ultimately result in an increase in circulating estrogen levels and impact the gonads in fish. The goal of this study is to display the harmful effects that estrogenic EDCs have on the Amphiprion ocellaris species through an eight week long experiment. This study builds off previous research that shows how EDCs directly impact factors such as sexual reproduction, behavioral response, gene expression, and endocrine responses. Despite these studies, there still remains a gap in research pertaining to how protandrous hermaphroditism is impacted by the presence of EDCs in aquatic ecosystems. In successfully completing this study, the negative effect that EE2 and BPA have on protandrous hermaphroditism in Amphiprion ocellaris will be determined. This study will show the stress that these chemicals have on the HPG axis and how this in turn impacts the gonads of fish whilst trying to undergo male to female sex change after the female has been removed from the population, as well as the rate of sex change.

# Born of Salt: Magical Realism, Othered Emotions, and Domestic Domination in Like Water for Chocolate

**Laura Clavijo**

Faculty Mentor: Dr. Nels Pearson

Meditz College of Arts & Sciences

Booth: 82

*This research was supported by the Humanities Institute Fellowship*

**Abstract:**
This paper examines Laura Esquivel's Like Water for Chocolate through the lens of magical realism as a literary mode that validates dominant reality while othering what it cannot contain – namely, Tita's emotions, interiority, and subjecthood. Rather than reading Tita as the protagonist, this paper argues that Mama Elena is the true driving force of the narrative, whose authoritarian presence structures a slave owner/slave dynamic within a matriarchal household. Drawing on Sarah Ahmed's concept of affective economies and Freud's theory of displaced fear, this paper further argues that Mama Elena's enforcement of family tradition is itself symptomatic of a deeper, repressed fear of abandonment –making the tradition a self-perpetuating system of control that imprisons both women. The novel's hyperbolic magical realist mode is understood not as stylistic decoration but as the inevitable linguistic consequence of Tita's denied subjecthood: a language of excess born from a life lived entirely under domination. To support such arguments, theoretical frameworks not only from Ahmed but also from Christopher Warnes, Kim Anderson Sasser, and Orlando Patterson ground the analysis of magical realism as both a genre and a political mode.

# Gender, Power, and Evolution in Classic Fairy Tales

**Elizabeth DiBenedetto**

Faculty Mentor: Dr. Nels Pearson

Meditz College of Arts & Sciences

Booth: 83

**Abstract:**
For my capstone project I will be looking at classic fairy tales involving animal to human transformation such as The Frog Prince by the Grimm Brothers and The Pig King by Giovanni Straparola Drawing from scholarly books and essays by Jack Zipes and other scholars, I will investigate how gender roles play a part in how these tales are told and more specifically how each author makes the men treat the women throughout each tale. I will be looking into why in the majority of these tales, women are always the victim or domesticator of male animality, then forgotten after the human transformation, such as turning from a frog or donkey into a prince. I will also be looking into the idea that these fairy tales are used to portray how men and women are supposed to act and desire in real life as well as how these actions reflect older notions of how sexuality and gender evolve biologically.

# Why the Not-so-Sudden Interest? Edith Wharton, Italian Visual Culture, and a Protestant Woman's Understanding of Catholicism

**Charlotte Lignowski**

Faculty Mentor: Dr. Nels Pearson

Meditz College of Arts & Sciences

Booth: 84

**Abstract:**
Edith Wharton spent multiple years of her childhood living in Italy, which fostered her intuitive mind and cultivated her admiration for Italian visual culture. Returning to America made Wharton appreciate Europe even more; she yearned for what she saw as beauty and order based on visual symmetry as well as the harmonization of man-made and natural elements. Inspired by her Italian upbringing and desire to escape elite New York society, Wharton studied European architecture and art; and she learned how to observe the world as an artist would. When Wharton returned to Italy as an adult, for instance, she discussed in detail the architecture, interior sacred art, and history of various churches. This signals an appreciation for Italian Catholic visual culture, which is further reflected in multiple of Wharton's fictional works. Upon closer reading of Wharton's work, both fiction and nonfiction, one can also observe how Wharton understood Catholicism through studying the religion's visual products, particularly of Italian origin. This understanding eventually turned to reverent interest, and Wharton, though she did not ever convert, was drawn to the Catholic faith in the final years of her life.

# Allusion in James Joyce's "The Dead": How Readers Apprehend the Ambiguous Ending

**Caroline Mongon**

Faculty Mentor: Dr. Nels Pearson

Meditz College of Arts & Sciences

Booth: 85

**Abstract:**
Literary allusions to canonical literature transcend century, artistic movement, and literary tradition. Often, modernist writers employ allusion to define characters, to underscore a piece's implied argument, or to suggest a connection between the present work and prior literary traditions. James Joyce's collection of short stories, Dubliners, shares in this tradition. Regarded as the most famous short story from the collection, "The Dead" alludes to canonical works of fiction, prominent figures of Catholic Ireland, and to writers of canonical literature. Since the mid-twentieth century, scholars have assessed the allusions within "The Dead" as significant to the story's ambiguous ending. As readers follow the apprehensive Gabriel Conroy through the winter night, uncertainty manifests in the protagonist's identity, positing the question: do the Irish and British allusions serve to represent Gabriel's internal conflict – his inherent Irish identity that is discordant with the "West Briton" label he has accrued? Moreover, the story's ending can be observed as a mortality that has been realized by the living. In this essay, I build upon analyses made by academics that situate the ending of "The Dead" as one defined by literary allusion. Through this, I examine how allusion informs Gabriel's internal conflict and greater, how Joyce employs allusion to suggest how mortality and identity are defined through a religious and cultural lens in early twentieth-century Ireland.

# Examining “Booktok” as a Solution to the Young Man’s Learning Crisis

**Sean Norton**

Faculty Mentor: Dr. Sonya Huber

Meditz College of Arts & Sciences

Booth: 86

**Abstract:**
“Booktok”, a community of readers on the popular social media platform Tiktok, has become a powerful force in the literary community, driving book sales and launching the careers of prominent authors like Coleen Hoover and Freida McFadden. This community generally circulates around books in the romance and “romantasy” genres, which attract woman-dominated readerships, and women have become the leaders of literary conversations online. Women’s power in publishing has extended from the digital world to wider cultural movements revitalizing interest in literature, and this has been a huge positive change for publishing as an industry. For the first time in history women are now publishing and purchasing more books than men, and sales across the industry have increased after recent years of regression. However, this also creates complications for young men’s interest in entering the space and engaging with reading, a problem which is reflected in declining test scores and reading levels compared to young women. For boys, the conversation on Booktok can be viewed as distant, uninteresting, and designed for different audiences, so they represent a proportionally tiny share of creators and viewership in this content niche. This project seeks to examine how boys have lost engagement with the practice of reading, the complications with boys entering the literary world through “Booktok”, and the potential for social media to bring a similar revitalization in reading culture among young men as it has for young women.

# Shaping Spain: Power and Resistance in the Making of a National Identity

**Ainsley Cavicchi**

Faculty Mentor: Dr. Covadonga Arango-Martin, Dr. Silvia Marsans-Sakly

Meditz College of Arts & Sciences

Booth: 87

**Abstract:**
The Spanish Inquisition is commonly viewed as a religious institution intended to protect the Catholic orthodoxy, yet scholars increasingly recognize its broader function as a tool in enforcing ideological unity and consolidating state power. While most research has examined the Inquisition's radical methods of persecution, less attention has been given to the ways in which targeted populations resisted such authoritarian mechanisms of control. This project examines how the Catholic Monarchs used the Inquisition to construct a unified national identity through deliberate and systematic erasure of Spain's diverse religious and cultural heritage under the Islamic Empire. Drawing on historical records of the Inquisition, this research demonstrates how conversos and Moriscos maintained elements of their Jewish and Islamic identities despite intense pressure to abandon them. This project argues that this resistance, expressed through hidden rituals and preserved cultural traditions, was central to the formation of Spanish national identity of Spain, ultimately reflecting the lasting influence of Spain's diverse religious and cultural past.

# Designing a State: Zionism and the Visual Politics of Nation-Building.

**Olivia Mattiola**

Faculty Mentor: Dr. Silvia Marsans-Sakly

Meditz College of Arts & Sciences

Booth: 88

*This research is affiliated with the Honors Program Thesis*

**Abstract:**
This study analyzes the visual politics involved in the creation of the Nation State of Israel and shows how these forms of art actively shaped political imagination, fundraising practices, and settler narratives. It highlights the gap in knowledge on how the visual media curated the national ideology behind the making of modern Israel. Presented chronologically, the project examines how Zionist media drew on Orientalism, symbols of economic production and improving the land, Labor Zionism, and the Jewish National Fund's fundraising efforts to curate the visual politics of state formation. These posters presented Zionist symbols and selective, at times imagined, depictions of the "Holy Land". Rather than merely reflecting Zionist ideology, they actively produced it by shaping political imagination, mobilizing financial support, and normalizing settler claims to the land. Read as historical sources rather than simple illustrations, these visuals reveal how the state was first designed as a realizable object of historical longing in culture before it was consolidated politically.

# A Semester Facilitating an English Enrichment class with Afghan Female Student Outreach: The Mutually Transformative Nature of a Cross-cultural Environment Rooted in Community Engaged Learning and the Ignatian Pedagogical Paradigm

**Payton McDonough, Mia Van Mater, Kara Eckert, Ava Grosso**

Faculty Mentor: Dr. Julie Mughal, Laraib Khan (University of Toronto)

Meditz College of Arts & Sciences

Booth: 89

**Abstract:**
Over two million women and girls in Afghanistan are currently denied access to education due to Taliban rule. In response, organizations like Afghan Female Student Outreach (AFSO) are committed to expanding education opportunities for these women by offering accessible, tuition-free virtual learning tools. As a community engaged learning course, students in the Spring 2026 Humanitarian Action Seminar helped facilitate one of AFSO's English enrichment classes. These interactions allowed Fairfield students, as well as the women in the AFSO community, to learn from one another both culturally and academically. In our research, we explored how the Afghan female students perceive the impact of the course on their lives and education, and simultaneously assessed how community engaged learning supports the fostering of global awareness for Fairfield University students. Rooted in the Ignatian Pedagogical Paradigm, we ultimately describe how teaching practices grounded in reflection, experience, and action can support academic and personal growth for all parties involved in a course emphasizing humanitarian action and social justice.

# Regulation to Reality: UAV Proliferation and the Limitations of Airspace Security

**Hannah Dambach**

Faculty Mentor: Dr. Dina Franceschi

Meditz College of Arts & Sciences

Booth: 90

**Abstract:**
This paper examines the proliferation of unmanned aerial vehicles (UAV) amongst nonstate actors and the threat that they pose to state sovereignty. The unique capabilities of drones in modern warfare include the delivery of explosive materials to a target using both kamikaze and aerial release techniques, expanding the risks posed to the national security of state actors. The paper identifies weaknesses in a states' ability to prevent the weaponization of UAVs through the lack of clarity in UAV legal authority, while calling attention to recent changes in military advancements directed at confronting drone deployments in furtherance of counterterrorism initiatives.

# Russia's Quest for Ontological Security in the Arctic

**Joseph Knapik**

Faculty Mentor: Dr. Jennifer Cook

Meditz College of Arts & Sciences

Booth: 91

**Abstract:**
As the Arctic Ice melts, nations are seeking to capitalize by placing assets and investments in that region. One of the biggest shifts will be the opening of a new trade route through the Arctic Ocean, slated to cut sea voyage times between Europe and Asia nearly in half. The major player in this competition is Russia, who over the last several decades, has spearheaded a major buildup of military bases, ports, and LNG extraction sites. These efforts are ostensibly to secure the trade route and develop its energy sector as a hedge against European and Western powers. Russia sees both the trade route and their energy sectors as points of leverage against Europe and perceives them as being dependent on both.

However, these leverage points are rather weak in practice. The sea ice is still a bit too thick for most commercial container ships to pass through and will remain that way for more years to come, rendering it a less viable alternative to the Suez Canal. In terms of energy, Russia's war in Ukraine has empowered Europe to move away from using Russian resources, shifting towards renewable resources and using natural gas from Norway and the US. The question remains of why Russia continues to invest resources in a less-than-productive theater. I will argue that a major factor in this is Vladimir Putin's personal psychology, who seeks to restore Russia's prestige as a great power and compensate for what he believes to be the failures of his predecessor, Boris Yeltsin. Another major factor is Russia's ontological security, and how it sees itself on the world stage, with consideration for ideas about Russian identity. This paper will compare Russia's Arctic investments to their war in Ukraine and their intervention in Syria to better examine Russia's ontological self-image.

# Walkable and Car-Centric Cities: A Literature Review Using the ADO Framework

**Jeff Wheeler**

Faculty Mentor: Dr. Ruchika Sachdeva

Meditz College of Arts & Sciences

Booth: 92

**Abstract:**
Walkability and walkable cities have become a very emergent topic in recent years. This paper argues that walkable cities provide a greater set of benefits than car-centric cities. Drawing on the existing literature, this paper synthesizes research into the ADO (Antecedents, Decisions, Outcomes) framework for a systematic literature review. The research has revealed that Antecedents such as zoning policies, historical trends, and various urban theories have contributed to the differing levels of walkability in cities today. These constructs, and the decisions people make based on them, have influenced the outcomes presented in this paper, specifically environmental sustainability, better public health, increased social cohesion, and stronger economic trends. The literature was collected from 45 articles, published between 2000 and 2024, from various fields of study and across many cities worldwide, to analyze walkable cities at the global level. The findings indicate that walkable cities do, in fact, have a superior set of benefits to car-centric cities, underscoring their importance for sustainable urban development. Overall, this article provides valuable insights into the benefits and challenges of walkable and car-centric cities, and highlights the need for further research.

# Invisible Barriers: Language Ideologies and Access to Health Care for Spanish-Speaking Patients

**Janelyne Avila**

Faculty Mentor: Dr. Sergio Adrada Rafael

Meditz College of Arts & Sciences

Booth: 93

**Abstract:**
This capstone project investigates the impacts of linguistic ideologies in the United States on the access to Spanish communication for patients with limited English proficiency (LEP) in the health care systems. Although Spanish is the second most spoken language in the country, health services tend to operate under ideologies that prioritize English. These ideologies influence the accessibility to services such as interpretation and translation in health care and impact the value of communication between health professionals and Spanish-speaking patients. Through the analysis of academic review articles, this project examines how ideologies limit language accessibility and how these limitations affect the quality, safety and equity of health care. The results show constant themes such as the lack of resources, training and inadequate use of language services. These language barriers create clinical and emotional implications such as accepting the health risks and delays in receiving care without fully understanding what is being communicated. On the other hand, the results show how language concordance and implementation of language resources improve the health and medical experiences of patients.

# The Role of Spanish in U.S. Soccer Media: Promotion, Normalization, and Cultural Identity

**Kate McNamee**

Faculty Mentor: Dr. Sergio Adrada Rafael

Meditz College of Arts & Sciences

Booth: 94

**Abstract:**
This research project examines the role of Spanish in the growth of soccer culture in the United States and how the media has influenced its spread. Drawing on historical, cultural, and media perspectives, the study focuses on the relationship between Spanish-language broadcasting and the growing popularity of soccer among Hispanic communities. Studies on the history of Mexican-American sports, such as the work of Iber and Regalado (2007), demonstrate how athletics has long been linked to community identity and cultural expression. Similarly, Parra's research on Spanish-language television highlights how the media has functioned as both a cultural space and a linguistic platform. These historical foundations demonstrate that language has consistently shaped how communities experience soccer. Furthermore, the project explores the contemporary media landscape, particularly through the role of Telemundo, ESPN, and other networks in acquiring broadcast rights and expanding soccer's reach. These agreements not only determine the sport's visibility but also ensure that Spanish remains a prominent public language in American sports. Audience data on Hispanic soccer viewers demonstrates how fans use language, connecting people to both the sport and broader cultural identities. By combining historical analysis, media studies, and audience research, this project argues that Spanish-language soccer coverage has been fundamental to making the sport accessible, popular, and culturally significant in the United States. Ultimately, Spanish functions not only as a medium of communication but also as a source of identity and community, strengthening its role in American public life through soccer.

# Reflections on the Potential Tedium of Immortality

**Brandon Ally**

Faculty Mentor: Dr. Steven Bayne

Meditz College of Arts & Sciences

Booth: 95

**Abstract:**
If death is regarded as bad, then would it not be the case that a life without death is good, or at least better? Despite the unfeasibility of such an existence, humans throughout time seem enamored with this question. One must simply look back to the Epic of Gilgamesh, one of the oldest surviving literary texts in human history, to find a story of a man enduring trials and hardships in his search for eternal life. While most presume that an immortal life would be meaningful and worth pursuing, if it were possible to do so, Bernard Williams in his chapter titled "The Makropulos Case: Reflections on the Tedium of Immortality" argues that immortality would either become eternally boring or would result in a change in a person's character such that their past self would not be able to identify with their future self. Williams thus argues that an immortal life cannot be good. In this essay, I will argue that immortality can be, but is not always, good and that the goodness or badness of immortality for a person is determined by the number and strength of their categorical desires. In addition, I utilize Derek Parfit's theories to propose an alternate definition of self-identity that, if it is found to be more congruent with the human experience, would not erode even with the eternal passage of time.

# Pay to Play: The Cost of American Democracy

**Sean Acheson**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 96

**Abstract:**
This policy analysis looks at whether current campaign finance laws actually protect democratic representation in the United States and whether they still work the way they were intended to in today's political system. It also explores whether changes are needed to limit the influence of large donors and make the system more transparent, helping to ensure a fairer and more balanced political process. Existing scholarship and legal precedent, particularly following Citizens United v. FEC, suggest that unlimited independent expenditures and the rise of super PACs have dramatically increased the role of wealthy individuals, corporations, and "dark money" in elections. While campaign finance regulations remain in place, the problem still persists that elected officials spend a lot more time fundraising and become more responsive to major donors than to constituents. This analysis expands upon existing debates by focusing specifically on policy reforms that are constitutionally and politically achievable within current institutional frameworks, rather than proposing major constitutional amendments. Additionally, it will determine which alternative holds the best likelihood of success. To do this I will use the Bardach Eight-Fold path methodology to examine four possible alternatives such as Strengthened Campaign Finance Disclosure Laws, Public Financing of Federal Elections, Stronger Regulations on Super PAC Coordination, and Small-Donor Incentive Programs. I contend that without meaningful reforms, large donors and current funding mechanisms will continue to distort democratic priorities and undermine public trust. Strengthening transparency requirements and limiting the influence of "dark money" within constitutional boundaries is essential to restoring accountability and improving democratic representation.

# Behind the Scenes: Inconsistent OSHA Enforcement in Temporary Film Worksites

**Michaela Alsiadi**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 97

**Abstract:**
Workplace safety on film and television production sets is challenging to regulate because the industry relies on temporary worksites, mobile productions, and short-term employment structures. These factors hinder OSHA's consistent enforcement and disproportionately increase the risk for below-the-line crew members. Drawing on existing literature regarding workplace safety enforcement and regulatory gaps in nontraditional labor settings, this study advances prior research by examining the structural constraints specific to film production. The analysis uses the Eightfold Path framework to evaluate policy alternatives to enhance safety oversight in this sector. Each alternative is assessed according to effectiveness, administrative feasibility, cost, equity for vulnerable workers, and political viability. The findings inform policy scholarship by demonstrating how regulatory frameworks can be adapted to address decentralized, project-based industries more effectively. Of the options evaluated, a combination of industry-specific inspection protocols and enhanced coordination between OSHA and state film offices emerges as the most effective solution.

# Equal Rights, Unequal Access: Disability Discrimination in Higher Education

**Madeleine Babcock**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 98

**Abstract:**
Despite the current laws, students with disabilities face discrimination within higher education settings. Research shows that current policies are not adequately enforced. This study will examine the most effective way to reduce the discrimination disabled people face in higher education. I will be using Bardach's Eight-Fold Path to analyze the policy options to determine the best solution to this issue. I contend that better enforcement of the current laws will be the most effective way to decrease this discrimination.

# Too Full To Function: Overcrowding in State Prisons

**Moira Brownyard**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 99

**Abstract:**
Overcrowding in state prisons across the United States has led to populations that exceed intended facility capacity, with particularly acute challenges in Nebraska's correctional system. This study examines which policy option most effectively addresses overcrowding in state prisons across the United States, while paying specific attention to the structural and policy conditions contributing to overcrowding in Nebraska. Existing scholarship identifies sentencing laws, parole limitations, and high recidivism rates as primary contributors to sustained prison population growth, yet there remains debate over which reforms produce meaningful and sustainable outcomes. This research expands upon prior analyses by comparing four policy options through Dr. Eugene Bardach's Eightfold Path model with regards to four criteria grounded in public administration values: effectiveness, public safety, equity and justice, and administrative feasibility. This analysis hypothesizes that expanding diversion programs and specialty courts will be the most effective policy option, as it can reduce prison overcrowding while maintaining public safety, promoting equitable outcomes, and remaining feasible for state justice systems to implement, particularly in Nebraska's overburdened prison system. The findings contribute to larger discussions about correctional reform by clarifying which policy tools are most capable of addressing the overcrowding issue without compromising core public administration principles, with implications for states facing similar capacity crises.

# The Clean Plate Project

**Lucy Carnegie**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 100

*This research is affiliated with Climate, Coastal and Marine Studies*

**Abstract:**
This study examines how chemical pesticides used in modern agriculture affect human health. Previous research has shown that chemical pesticides increase agricultural productivity but are also linked to serious health concerns such as cancer, neurological disorders, and respiratory illness. While many studies focus on the health impacts of pesticides, fewer examine which policy approaches are most effective at reducing these risks. Using Eugene Bardach's Eightfold Path, this project conducts a policy analysis comparing different policy options for regulating pesticide use and promoting safer agricultural practices. I contend that my policy analysis will show that policies combining stricter regulation of chemical pesticides with sustainable farming practices will be more effective at reducing pesticide-related health risks. These findings will provide recommendations to balance agricultural productivity with improved public health and safety.

# Gendered Geopolitics: How U.S. Foreign Policy Reshaped Gender in Syria

**Caroline Cossman**

Faculty Mentor: Dr. Samual Biasi

Meditz College of Arts & Sciences

Booth: 101

**Abstract:**
The Syrian Civil War endured for over a decade, and although the immediate conflict may have subsided, the country is still entrenched in a calamitous post-war transition period. This paper investigates the role of the United States throughout the Syrian Civil War, particularly its effects on the political status and rights of women. By comparing the Obama and Trump administrations' foreign policy stances, this project explores the significance of American action on Syrian women during the war. Using an extensive discourse analysis of executive orders, legislative acts, speeches, and communication from Kurdish militant organizations and the Islamic State, I contend that United States foreign policy has had a considerable effect on gender relations in Syria. The Obama administration lent support for the Kurdish People's Defense Unit (YPG) and Women's Protection Unit (YPJ), who created a radically feminist system of governance. However, the Trump administration abandoned these groups just years later, leading eventually to a victory for the conservative Islamist faction which has attempted to stamp out the self-governance structures established by the Kurdish militants. The change in foreign policy will be argued to have been gendered, shown by the switch from a pragmatic liberal masculinity under Obama to an isolationist revanchist masculinity under Trump. Using feminist gender and security theories, I dissect and analyze policies and communications from the Obama and Trump administrations, as well as Kurdish groups and ISIS, to better understand how changes in American foreign policy affected the way Syrian women live, what they do, and their status in post-war Syria.

# Mandatory Minimum Sentencing in Connecticut: Balancing Public Safety, Fairness, and Cost

**Alexander Der Stepanian**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 102

**Abstract:**
Alex Der Stepanian POLI 2103: Public Administration March 19th Dr. Alberda Abstract Mandatory minimum sentencing laws require judges to impose fixed minimum sentencing laws for certain criminal offenses, limiting judicial discretion in sentencing decisions. While many of these laws are often intended to promote consistency in sentencing and uphold public safety, research on mandatory minimum sentencing laws has produced mixed conclusions regarding their impact on incarceration levels, sentencing fairness, and crime reduction. Much of the existing data examines policies at the state and local level or across multiple states, often overlooking how these laws operate within the individual state criminal justice systems such as the ones within Connecticut. This analysis evaluates alternative sentencing approaches to determine which policies most effectively address concerns related to incarceration patterns and sentencing outcomes in Connecticut. Using Eugene Bardach's Eightfold Path framework, I conduct a policy analysis comparing five policy options against four criteria: public safety, fairness, cost, and administrative feasibility. I contend that alternative sentencing approaches may better balance public safety goals with fairness and efficient use of correctional resources. Understanding the implications of different policy options is crucial for policymakers considering reforms to Connecticut's sentencing policies.

# Mandatory Minimum Sentencing in Connecticut: Balancing Public Safety, Fairness, and Cost

**Alexander Derstepanian**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 103

**Abstract:**
Mandatory minimum sentencing laws require judges to impose fixed minimum sentencing laws for certain criminal offenses, limiting judicial discretion in sentencing decisions. While many of these laws are often intended to promote consistency in sentencing and uphold public safety, research on mandatory minimum sentencing laws has produced mixed conclusions regarding their impact on incarceration levels, sentencing fairness, and crime reduction. Much of the existing data examines policies at the state and local level or across multiple states, often overlooking how these laws operate within the individual state criminal justice systems such as the ones within Connecticut. This analysis evaluates alternative sentencing approaches to determine which policies most effectively address concerns related to incarceration patterns and sentencing outcomes in Connecticut. Using Eugene Bardach's Eightfold Path framework, I conduct a policy analysis comparing five policy options against four criteria: public safety, fairness, cost, and administrative feasibility. I contend that alternative sentencing approaches may better balance public safety goals with fairness and efficient use of correctional resources. Understanding the implications of different policy options is crucial for policymakers considering reforms to Connecticut's sentencing policies.

# Toxic by Design: Environmental Injustice and Public Health in Detroit

**Morgan Fedorchak**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 104

*This research is affiliated with Climate, Coastal and Marine Studies*

**Abstract:**
Citizens of the city of Detroit have faced disproportionate exposure to toxins from industrial facilities and undesirable infrastructure that can lead to health problems in the future. Despite these concerns, the local government of Detroit, and other cities around the country, have seen little change in the pattern of undesirable buildings occurring in redlined neighborhoods. Citizens of these neighborhoods have a disproportionately higher risk of developing cancer and adverse respiratory health outcomes from air toxins created by these facilities. Local grassroots efforts frequently focus on stopping the creation of new facilities, but existing facilities continue to harm the people of Detroit, and there is a lack of research about what policies would benefit citizens of Detroit the most. While preventing new facilities is a natural strategy, there are many options that the city of Detroit could implement to yield similar or better results for citizens. My analysis will determine the best strategy for the local government of the city of Detroit to implement to improve upon the environmental injustice currently happening. Using Eugene Bardach's Eightfold Path, I conduct a policy analysis to evaluate four policy options that would reduce health concerns from environmental injustice using the following criteria: financial feasibility, effectiveness, justice, and structural durability. I contend that stopping the creation of new facilities alone will not be the best policy option for reducing health issues, and policymakers should instead focus on reducing the emissions of current facilities through regulation. Without changes to the current state of environmental injustice, the citizens of Detroit will continue to struggle, and new policy options should be considered in order to prioritize health and safety.

# Code Blue for Nurses' Rights

**Julia Fuggetta**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 105

**Abstract:**
Workplace violence against nurses remains prevalent in hospital settings despite existing safety policies and regulatory oversight. This raises the question: Are current government labor and safety regulations sufficient to protect nurses in U.S. hospitals? Scholarship indicates that workplace violence in healthcare is widespread and particularly severe in high-risk environments such as emergency departments and psychiatric units, which suggests that the problem is structural rather than isolated. Though research documents the prevalence and consequences of workplace violence, less attention has been given to whether existing regulatory frameworks effectively address the institutional causes of workplace violence. Using Eugene Bardach's Eightfold Path, this analysis evaluates policy approaches to reducing workplace violence based on criteria such as effectiveness, administrative feasibility, and public cost. I contend that current oversight mechanisms are insufficient because they rely on hospital compliance rather than enforceable, healthcare-specific federal standards. My findings suggest that stronger, more targeted regulatory interventions are necessary to reduce violence, stabilize the nursing workforce, and protect the continuity of essential healthcare services. This research is important because workplace violence extends beyond individual harm and creates broader social costs, including staff shortages, increased public expenditures, and reduced healthcare quality, thereby affecting both public institutions and the communities they serve.

# Perpetrators in Power: The Trump Administration's gendered foreign policy violations of Iranian Sovereignty

**Hailey Guzman**

Faculty Mentor: Dr. Samual Biasi

Meditz College of Arts & Sciences

Booth: 106

**Abstract:**
Why has the Trump administration pursued such an aggressive foreign policy? This paper argues that the Trump administration's international actions reflect an underlying rape culture: that the Trump movement's ideological tolerance of violating women's autonomy is reflected in its violations of sovereignty. Allowing convicted and accused sex offenders to hold government office has facilitated the staunch "anti-woke" movement and hyper-masculinized right-wing politicians who endorse the defilement of foreign regimes and their sovereignty. I use the Trump administration's historical and current warmongering towards the Middle East, particularly Iraq and Iran, to show that a culture of male dominance and gender subordination has manifested in masculinized foreign policy tactics and violations of state autonomy, especially the defiling sanctity of Middle Eastern sovereignty to assert U.S. hegemony. I draw my conclusions from research conducted by international security theorists who observe state behavior not as emotionless entities but as anthropological representations of gender norms. I engage in discourse analysis on gendered state behavior and the parallels between state sovereignty and virginity, equating Western invasion with the rape of a nation, reviewing statements and policies of the Trump administration, and how they construct and deploy a particularly violent masculinity. I also identify the contents of this masculinity relevant to rape culture by identifying sexual assault allegations against key members of the Trump administration. My findings contribute to a broader conversation on gendering state-identity by providing a specific case study of the United States' treatment of Iran and Iraq, delineating the U.S. as an international assailant that debases Iranian and Iraqi sovereignty, driven by a culture born from the overwhelming prevalence of perpetrators in power.

# Dirty Jersey: Moving on from Polluted Sites in the Garden State

**Anna Heras**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 107

*This research is affiliated with Climate, Coastal and Marine Studies*

**Abstract:**
Superfund Site cleanup in New Jersey is frequently stagnated or slow moving, posing prolonged risks to the public and natural environment. New Jersey's 115 sites are of amplified concern because of the state's densely populated nature, as contaminants that emanate from the sites threaten public health. New Jersey and the United States Environmental Protection Agency (EPA) struggle to manage and treat the contaminated sites effectively and efficiently due to both administrative delays and the struggle to recover monetary damages from polluters themselves, leaving many sites orphaned. This research seeks to redefine how the EPA and the New Jersey Department of Environmental Protection (NJDEP) can overcome administrative barriers to quickly and effectively remediating hazardous Superfund Sites using Eugene Bardach's Eightfold Path to evaluate policy options under the criteria of effectiveness, efficiency, administrative feasibility, and public health impact. I contend that an expansion of NJDEP authority over federal Superfund Site cleanup will yield the most positive results under these criteria. Ultimately, I will show how more effective state and federal partnerships can produce positive results in also helping New Jersey recover from the impacts of its industrial history.

# Fighting for Equality? Gender, Militarization, and the Persistence of Hierarchy in Israeli Society

**Shannon Hockford**

Faculty Mentor: Dr. Samual Biasi

Meditz College of Arts & Sciences

Booth: 108

**Abstract:**
Including women in the military has been a controversial issue across the world, with some feminists championing the idea and others deriding it. In Israel, women's participation in the military has not improved their position in broader Israeli society. This paper asks: how does mandatory military service shape constructions of masculinity, femininity, and citizenship within Israeli society, and why do gender hierarchies persist despite women's participation? Drawing on feminist and militarization theory, particularly the idea that militaries both reflect and reinforce gendered power structures, I examine how military institutions prioritize certain forms of masculinity while positioning women in more limited or symbolic roles. Using qualitative analysis of existing scholarship, Israeli cultural production, Israeli military discourse, and case studies on Israeli military service, I argue that women's inclusion in the military appears to promote equality, it often reproduces existing hierarchies by privileging combat roles and masculine ideals as the foundation of full citizenship. Additionally, in part because of Israel's mandatory military service, militarization extends beyond the military itself, shaping broader social and political norms, which further reinforces gendered expectations and hierarchies. Overall, this project shows that gender inequality is not eliminated through women's participation in the military: alone, but instead, it is actively maintained through militarized institutional and cultural structures.

# Warehouses vs. White Picket Fences

**Logan Keane**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 109

**Abstract:**
This paper examines the proposed warehouse development in Middlebury, Connecticut, and analyzes its potential economic, environmental, and social impacts on the local community. As shipping and storage infrastructure expand across the United States, distribution centers are increasingly being proposed in suburban and rural towns that were not historically designed for large scale industrial activity and heavily trafficked roads. The Middlebury warehouse proposal provides a case study for understanding how small communities respond to these changes. This research project explores the potential economic benefits of the project, including job creation and increased tax revenue, while also considering concerns raised by residents regarding traffic congestion, environmental effects, and changes to the town's character and small nature. By reviewing public legal records, local reporting, and similar cases on warehouse infrastructure, this study evaluates how local governments attempt to balance economic development with what the community desires. Ultimately, the paper concludes that while warehouse development can provide economic opportunities, communities such as Middlebury must carefully weigh these benefits against long-term impacts on infrastructure, environmental sustainability, and quality of life.

# Protection on Paper: Why Connecticut's Child Protection System Isn't Protecting

**Lindsay Kolesnik**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 110

**Abstract:**
The Connecticut Department of Children and Families (DCF) is tasked with protecting children and ensuring they receive stable, supportive care. This research investigates whether DCF appropriately addresses any administrative shortcomings. Recent research suggests that Connecticut's DCF has consistently been found to be out of compliance with federal safety, permanence, and well-being criteria in the Federal Child and Family Services Reviews. Furthermore, the Connecticut department is suffering from a loss of public confidence in its efficiency. To determine whether reform is required, this research assesses DCF's administrative responsiveness and structural flaws using Burdoch's Eightfold Path. I conduct a policy analysis evaluating the administrative performance against the criteria of responsiveness, efficiency, institutional integrity, accountability, and effectiveness. I further contend that DCF's system requires immediate reform because its capacity to meet federal safety and permanency standards is compromised by administrative discrepancies and structural inefficiencies. A large part of this research focuses on DCF's inconsistencies and unresponsiveness, and how they have left many children and families under considerable stress. This analysis highlights the need for greater accountability and transparency in the state's child welfare system. With the aim of providing guidance to strengthen the department's structures and improve child safety outcomes throughout the state.

# One Person's Trash, Everyone's Problem: Illegal Dumping in Queen

**Jonathan Lazo**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 111

**Abstract:**
Illegal dumping remains a persistent quality-of-life issue in many neighborhoods across Queens, New York City. While existing sanitation enforcement and municipal cleanup efforts attempt to address the problem, research and policy discussions suggest that enforcement alone has produced mixed results and has not eliminated illegal dumping in many urban areas. Much of the existing discussion focuses on enforcement measures or public awareness campaigns, yet fewer analyses compare multiple administrative policy alternatives available to local governments. This study examines policy options that New York City could implement to reduce illegal dumping in Queens. Using Eugene Bardach's Eightfold Path, this paper conducts a policy analysis evaluating several alternatives against criteria including effectiveness, cost, equity, and administrative feasibility. The analysis suggests that relying solely on existing enforcement mechanisms is unlikely to significantly reduce illegal dumping compared to alternative approaches that improve reporting systems, disposal access, and targeted enforcement. Understanding which policy options most effectively address illegal dumping can help city officials allocate resources more efficiently and improve neighborhood cleanliness and quality of life.

# Visible Victims, Invisible Politics: Gendered Media Narratives in Gaza

**Samantha Learson**

Faculty Mentor: Dr. Samual Biasi

Meditz College of Arts & Sciences

Booth: 112

**Abstract:**
How do media portrayals of women victims in war construct hierarchies of empathy, and what are the political consequences of whose suffering is made visible? I argue that representations of women's sufferings are not neutral but are constructed through gendered narratives that emphasize vulnerability, moral worth, and innocence. However, these portrayals are selectively amplified or depoliticized, hiding the structural political conditions that produce violence. By analyzing media coverage and patterns of humanitarian action, this project explores how Palestinian women's experiences are used to push a narrative in ways that evokes empathy but limits political accountability. I argue that these gendered representations contribute to unbalanced humanitarian responses and reinforce broader hierarchies of visibility, where some forms of suffering are recognized and others are marginalized. More specifically, Palestinian women have been depicted often as passive and apolitical victims, while Palestinian men are more often associated with militancy or threat. In contrast, Israeli women are seen as individual victims whose suffering is visible, personal, and deserving of immediate response. This deep contrast reveals how gendered and racialized narratives work together to shape who is portrayed as worth protecting and innocent. I argue that these uneven representations contribute to the lack of humanitarian responses while reinforcing broader hierarchies of visibility. Together, these portrayals construct a hierarchy of empathy that dictates which lives are priority, which are mourned, and which are left out of political concern altogether.

# Feminizing Refugees: How Trumpian Hyper-Masculinity Drives American Refugee Policies

**Megan Lipka**

Faculty Mentor: Dr. Samual Biasi

Meditz College of Arts & Sciences

Booth: 113

**Abstract:**
The Trump administration has focused on defunding nonprofit organizations for refugees that help aid them in building a life in the United States. The Trump Administration broadly views refugees through a feminized lens: as weak individuals threatening the social fabric by disrupting social hierarchies. The Trump administration is rooted in a deeply gendered movement and ideology; specifically, a toxic masculinity that is threatened by individuals who are looking for basic needs. This project seeks to understand this gendered view of refugees in the United States, conducting a series of interviews with staff of a refugee aid organization to better understand how their work is affected by the federal defunding of nonprofit organizations aiding refugees, and how these policies represent gendered understandings of refugees. This study generates insight to the experiences of the staff of the refugee aid organization in the age of the Trump administration, and how their work is deeply affecting the lives of refugees based on the gendered policies in action in the current political moment. I find that the Trump administration's policies are a product of their constructed American masculinity rooted in isolationism, affirming social hierarchies privileging white men, and feminizing the marginalized – especially refugees. These hyper-masculine policies have severely limited refugee aid organizations in performing their essential functions and harmed the lives and livelihoods of refugees themselves.

# Lost in Code: Transparency & Oversight within Corporate Tax Policy

**Juliet Lipsky**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 114

*This research is affiliated with the Center for Social Impact*

*This research was supported by the Humanities Institute Fellowship*

**Abstract:**
This analysis will examine whether federal administration oversight of corporate tax expenditures ensures compliance, accountability, and public benefit. The current scholarship shows that corporate tax expenditures, such as deductions, credits, and deferrals, reduce federal revenue but receive less systematic review and oversight than traditional spending programs. The current research debates the size and fairness of corporate taxation; in this analysis, I will take it one step further by focusing on the administrative perspective, including evaluation and oversight tools. Using Eugene Bardach's Eightfold Path, this policy analysis will evaluate five policy options against four criteria: administrative feasibility, effectiveness, fiscal impact, and equity. I contend that adopting structured evaluation requirements and strengthening transparency tools will enable a sustainable, accountable framework for managing corporate tax expenditures. These results strive to improve federal fiscal accountability by strengthening public administrators' institutional capacity to evaluate and manage complex tax expenditures.

# Flooding the Lone Star State

**Charlotte Middleton**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 115

*This research is affiliated with Climate, Coastal and Marine Studies*

**Abstract:**
Catastrophic flooding in Texas continues to cause extreme property damage and community disruption in urban areas despite existing disaster assistance programs. While extreme one-day precipitation has increased by 5% to 15% since the late 20th century, with another 10% expected by 2036, policy responses have often been limited by cost concerns and the shifting of federal climate priorities. Previous studies focus primarily on climate science projections or disaster recovery outcomes; however, this paper investigates policy implementation and administrative communication failures at the state and local levels, with particular attention to equity concerns for low-income and historically marginalized communities. Using Eugene Bardach's Eightfold Path framework, I evaluate five policy alternatives across the four criteria of effectiveness, equity, administrative feasibility, and cost feasibility. I find that ineffective governmental coordination reduces the overall impact of flood mitigation efforts, and I contend that a statewide early flood warning system is the most effective and administratively feasible solution. Flooding in Texas is not solely a natural disaster problem, it is also a governance and coordination issue.

# Beyond One Pipe: Expanding Water Infrastructure Reform in Waterbury, CT

**Mariela Munoz**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 116

*This research is affiliated with Climate, Coastal and Marine Studies*

**Abstract:**
The City of Waterbury, Connecticut has persistent aging water infrastructure, specifically aging pipelines that affects the water quality and health of individuals. One common policy option is replacing aging pipelines, and research shows that there is a delay due to high costs and limited funding. There are other alternatives that can be similarly effective, reliable, and less costly. While replacing pipelines is a usable option, there are other alternatives that can be similarly effective, and my analysis will examine these options to determine which is the most effective. Using Eugene Bardach's Eightfold Path, I will evaluate four policy options for reducing aging pipelines using four criteria: effectiveness, cost, equity, and financial feasibility. I contend that replacing aging pipelines is not the best policy option for reducing concerns about unsafe water. Decision-makers should consider alternative policy options before implementing replacement that will be part of the decision-making process ensuring safe water quality for residents.

# Between Rights and Risk: Gun Policy and Public Saftey in Mississippi

**Josephine Reed**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 117

**Abstract:**
Gun violence and gun-related deaths are disproportionately high in Mississippi compared to other states in the U.S. While there are some existing gun ownership limitations and regulations, I am researching what policy or regulation changes can be made to decrease gun-related deaths in Mississippi. In Mississippi, it is relatively easy to obtain a gun because you are not required to have a permit, background check, license, or registration for firearms. This directly correlates with the fact that Mississippi has some of the highest gun-related deaths per year compared to other US states. I will be exploring 5 policy options using 4 sets of criteria to evaluate my options. I will use Bardach's 8-fold path to determine the feasibility, cost, and effectiveness, and speed of impact of the different gun regulations to reduce deaths in Mississippi. I contend that this method will work in helping me narrow down the best criteria to research upon and yield the most accurate results. This research is important because there are human lives at risk, and it is important to make every effort to find the root of these deaths and put an end to enabling it.

# Finding a Bed in the City That Never Sleeps: New York City's Rental Affordability Crisis

**Henry Smith**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 118

**Abstract:**
New York City is experiencing a shortage of affordable rental housing to meet the needs of its citizens, placing many middle and low-income residents at risk of displacement or housing insecurity. Independent and government research consistently reports record low rental housing availability, especially among units under $2400 per month, and concerningly high rates of New Yorker residents classified as rent-burdened. This research will analyze a combination of state and local policy options to assess which public administration actions would be most effective at improving rental affordability and availability. Employing Bardach's Eightfold Path, this analysis assesses each policy option for effectiveness, equity, financial practicality, and political feasibility. I contend that a combination of targeted rent stabilization to alleviate the burden on those immediately at risk, coupled with expanded inclusionary zoning, is most likely to improve affordable housing availability. By understanding the strengths and weaknesses of different policy options, policymakers can strategize a more well-informed plan to meet the basic housing needs of New York residents across all five boroughs.

# Overdose City: Evaluating New York City's Fight Against the Opioid Epidemic

**Christina Stavropoulos**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 119

**Abstract:**
In New York City, the opioid epidemic is still a major public health concern. This raises an important question, why are opioid-related overdose deaths still at record highs if government legislation and preventative initiatives are already in place? Despite efforts like prescription monitoring systems, naloxone distribution, and increased treatment programs, public health data indicates that synthetic opioids like fentanyl have contributed to an increase in overdose deaths. This study assesses the effectiveness of policies in New York City and explores if alternative local tactics could more effectively tackle the continuous obstacles in treatment accessibility and coordination, whereas much research concentrates on the state and federal response. This study compares existing responses with potential alternatives using Eugene Bardach's Eightfold Path concept, taking into account factors such as administrative efficiency, financial viability, equity, and efficacy. The results show that high overdose rates are still caused by structural issues including unequal implementation and limited access to long-term rehabilitation, even if present laws have increased awareness and emergency response efforts. In urban communities dealing with substance addiction crises, this study highlights the need of boosting local policy responses to lower these fatalities and better the health of the public.

# Heroes of War: Gender, Violence, and Militarization in Superhero Culture

**Daniel Tarazona**

Faculty Mentor: Dr. Samual Biasi

Meditz College of Arts & Sciences

Booth: 120

**Abstract:**
How does the rise of superheroes as a central touchstone in American culture affect this paper. I examine how superhero culture contributes to the normalization of militarization through its construction of gender and violence. While often understood as entertainment, superhero narratives consistently frame violence as a necessary and morally justified response to conflict. Characters such as Captain America and Batman embody a form of masculinity rooted in discipline, control, and the capacity for violence, reinforcing the idea that protection and heroism are inseparable from force. At the same time, female characters like Wonder Woman and Black Widow are often incorporated into these narratives in ways that require them to adopt similar militarized traits, while still being subject to gendered expectations such as sexualization or secondary positioning. By analyzing these patterns, this project argues that superhero media does not merely reflect existing social norms but actively shapes them. These narratives function as a form of cultural socialization, training audiences to accept violence as a legitimate and even necessary tool for achieving justice and honoring these traits as a desirable masculinity. In doing so, they extend militarized logic beyond the battlefield and into everyday understandings of identity, morality, gender, and power. Ultimately, this paper raises the question of whether the dominance of violence in superhero storytelling limits the ways in which justice and conflict resolution can be imagined. Superheroes are produced by and productive of militarized conceptions of gender which encourage particular gendered violence in American men and women.

# Prescriptions for Profit: Monopolization of Healthcare

**Victoria Tauer**

Faculty Mentor: Dr. Gayle Alberda

Meditz College of Arts & Sciences

Booth: 121

**Abstract:**
The United States is currently operating under a free market capitalist system, where the federal antitrust laws in place prohibit monopolies that lessen competition. However, this research analyzes the vertical integration of healthcare that enables corporations to control multiple stages of production (including drug manufacturing, pharmaceuticals, insurers, providers etc.), effectively functioning as a monopoly by maximizing profit while avoiding federal interference. While existing restrictions on healthcare monopolization are broad, traditionally focusing on horizontal competition, this research narrows the focus to vertical integration as a loophole in current policies. I will conduct my research using Bardach's Eight-Fold Path to assess policy options that best address this issue through the case study of CVS Health. I will use the following criteria to assess the five policy options: political feasibility, consumer equity, effectiveness and cost. I contend that targeting and strengthening regulations on pharmaceutical benefit management (PBM) specifically will effectively limit the monopolistic effects of vertical integration, since this PBM is the main point of price negotiation between the different means of production. Because of today's inflationary economy, where consumers lack significant disposable income for everyday necessities, policymakers must consider a wide range of options to ensure lower and affordable prices at all stages of healthcare.

# Effects of Corticosterone Exposure on Anxiety-Like Behavior in Rats

**Eftyhia Fillas, Emily Alt, Abigail Galvin, Kate Gerrish, Maria Jobes, Tara Kevorkian, Ariana Kocovic, Emilia Robinson, Elena Scarso, Catherine Steele, Rebecca Suffel, Caroline Tomlinson, William Totz, Valerie Werhun**

Faculty Mentor: Dr. Karl Schmidt

Meditz College of Arts & Sciences

Booth: 122

**Abstract:**
Chronic stress is well known to be associated with increased anxiety-like behavior and is disruptive to normal feeding patterns. In rodents, chronic corticosterone (CORT) administration is a commonly used method to model prolonged stress exposure. Therefore, we sought to examine whether seven days of oral CORT exposure would affect anxiety-like behavior using the novelty-suppressed feeding (NSF). Upon arrival on postnatal day 42 (PN42), male Long-Evans rats were assigned to receive either CORT (300 µg/mL) dissolved in drinking water or water alone. Rats were given their assigned treatment for seven days, and each day we measured their body weight and fluid intake. At the end of the seventh day of treatment, the rats were food-deprived overnight. Following overnight food deprivation, rats were given a 15 min NSF test in a novel environment. During the test, we recorded the latency to approach the food, the latency to begin eating, and total sucrose consumption. Our results did not support our hypothesis, as we observed no statistically significant differences between CORT- and water-treated rats in any of the NSF measures. These findings suggest that seven days of CORT exposure were insufficient to provide measurable changes in anxiety-like behavior. This conclusion provides evidence for the importance of exposure duration, dosage, and behavioral test sensitivity when modeling stress-related behavioral outcomes.

# Women Talking: A Staged Reading

**Katharine Gutkoski**

Faculty Mentor: Dr. Lynne Porter

Meditz College of Arts & Sciences

Booth: 123

**Abstract:**
For the longest time, I have been fascinated by films of true stories involving women. I've watched On the Basis of Sex, Bombshell, Erin Brochovich, Hidden Figures, Harriet, A League of Their Own, and many more with my mother. It's one of the things we do together. The summer before my sophomore year, we watched Women Talking. Neither of us had seen it or knew anything about the events that inspired the novel and film. After we finished watching, my mum turned to me and said "This would be a great play. You should do it at Fairfield." It hasn't left my mind since. While the characters are fictionalized, the events are true. From 2005 to 2009, 130 women in the Manitoba Colony in Bolivia were sedated and raped by nine men in their colony. In 2018, Miriam Toews, an ex-Mennonite from a different colony, published Women Talking, a novel using fiction to explain the real events that occurred. In 2022, a film of the same name, adapted from the novel, written and directed by Sarah Polley, was released. It starred Rooney Mara, Claire Foy, Jessie Buckley, Judith Ivey, Ben Whishaw, and Frances McDormand. As my Theatre Capstone project, I am adapting both the novel and the film into a play and then directing a staged reading of the script. A staged reading is where an audience comes into a space with the actors, who have their scripts in hand and minimal blocking and costumes. There are few light and sound cues and a very minimal set. It is not a full-fledged production. Instead, it allows the audience to focus on the words of the play. This poster describes my process as a playwright, director, and actor: a culmination of my four years as a theatre major at Fairfield University.

# Reevaluating Mestizaje: Impacts on Sumak Kawsay and Indigenous Rights in Ecuador

**Syn Moyano**

Faculty Mentor: Dr. Jennifer Cook

Meditz College of Arts & Sciences

Booth: 124

**Abstract:**
Sumak Kawsay, a Kichwa term meaning "living well" or "life in fullness," is a foundational element of Ecuador's 2008 Constitution. This indigenous philosophy integrates harmony with nature, community wellbeing, and cultural identity, aiming to create a more inclusive and sustainable development model that respects indigenous rights and promotes ecological balance. Despite its constitutional recognition, the implementation of Sumak Kawsay has faced significant challenges, particularly due to poor enforcement. This paper will analyze the complex issue of identity in Ecuador and how it threatens the principles of Sumak Kawsay. The distinction between "indigenous" and "mestizo" identities, coupled with the social stigmas and stereotypes associated with indigeneity, has led many mestizos to reject their indigenous roots. This rejection creates vulnerabilities for lands and resources that could otherwise be protected under the principles of Sumak Kawsay.This paper examines the provisions related to Sumak Kawsay and indigenous rights in the Ecuadorian Constitution, exploring how these principles are reflected in laws and in the daily lives of indigenous people. This paper will highlight the practical challenges faced by indigenous communities in a political and economic system that may not fully support their way of life. It will also delve into the concept of mestizaje in Latin America, particularly Ecuador, analyzing its impact on identity and the protection of indigenous lands. Although it promotes a multi ethnic society, mestizaje often praises whiteness over indigeneity, leading to the marginalization of indigenous and Afro-Ecuadorian identities.To better enforce Sumak Kawsay and protect lands and resources, this paper proposes redefining identity and moving away from mestizaje. Embracing indigenous ancestry and values can provide a framework for sustainable and inclusive development. Policy recommendations include strengthening legal protections for indigenous rights, promoting indigenous leadership, implementing educational reforms, and supporting grassroots movements. By understanding these dynamics and drawing on detailed literature, studies and analyses, this paper proposes a more nuanced and effective way to implement Sumak Kawsay in Ecuador, ensuring it genuinely transforms societal and political structures. If accomplished, Ecuador can serve as a model for an anti-capitalist alternative governance, offering a form of healing after years of indigenous erasure and rejection.

# SESSION III

## Faculty Mentored Independent Student Research Projects

- Sigma Xi Research Projects in Biology, Chemistry & Biochemistry, Math, Physics, and Psychological & Brain Sciences, as well as Engineering and Computing
- Independent Projects in Meditz College of Arts & Sciences, Dolan School of Business, Egan School of Nursing and Health Studies and School of Education and Human Development
- School of Engineering and Computing Senior Design Projects

STUDENT RESEARCH SYMPOSIUM

# TORA: Topic-based Rule Affinity for Content Moderation in Social Media Communities

**Kevin Hanson**

Faculty Mentor: Dr. Kanlun (Sampson) Wang

Charles F. Dolan School of Business

Booth: 1

*This research was also presented at the the 18th China Summer Workshop on Information Management*

**Abstract:**
Social media platforms facilitate information and experience sharing across online communities, but their large-scale connectivity also amplifies the spread of misleading and potentially harmful content. Content moderation serves as a critical intervention for mitigating the dissemination of such content, and community rules play a central role in structuring moderation decisions. Despite prior studies on automated content moderation, few have explicitly incorporated community rules into moderation model design. Among the levels of social aggregation at which community rules operate, macro norms establish standardized governance principles, promoting consistency across communities; however, they have received little attention in automated content moderation research. To address the above literature gaps, this research introduces the TOpic-based Rule Affinity (TORA) framework that integrates macro norms of community rules into content moderation by following the design science paradigm. Grounded in multiple kernel theories, the framework introduces two novel design artifacts: macro norms representations, which capture and standardize rules across diverse communities using Large Language Models (LLMs), and a topic-based rule affinity measure, which quantifies the affinity between user-generated content and macro norms. We implement and evaluate the framework using data collected from multiple social media communities. Empirical results demonstrate that TORA consistently outperforms state-of-the-art baseline models, with both proposed design artifacts contributing significantly to improved performance. These findings make significant methodological and theoretical contributions and have implications for promoting social good by mitigating misinformation and supporting fairness and justice in online governance.

# Design Thinking Utilization in Sustainable Products and Services

**Ronald Elowitz**

Faculty Mentor: Dr. Carl Scheraga, Dr. Stanislav Vavilov

Charles F. Dolan School of Business

Booth: 2

*This research was also presented at the Eastern Academy of Management 2025*

**Abstract:**
Design Thinking Utilization in the Production of Sustainability-Focused Products and Services
Ronald S. Elowitz | DBA Candidate | Charles F. Dolan School of Business, Fairfield University
Sustainability-driven innovation demands that organizations navigate "wicked problems," complex and ambiguous challenges resistant to conventional solutions. While Design Thinking has emerged as a promising human-centered, iterative framework for tackling such challenges, a persistent gap exists between its theoretical potential and its practical enactment within organizations. Existing measurement tools assess Design Thinking primarily as an individual mindset rather than as an organizational capability. This research introduces the Extended Design Thinking Mindset Scale (EDTMS), a 32-item instrument developed to measure enacted Design Thinking behaviors across three dimensions: Inspiration, Ideation, and Implementation, within professional and sustainability-oriented settings. A pilot study conducted with 51 experienced practitioners across diverse industries found that Inspiration-stage behaviors were most strongly adopted, while Ideation and Implementation lagged, revealing structural and managerial barriers that prevent Design Thinking capabilities from being fully leveraged at the firm level. Exploratory analysis further indicates positive associations between Design Thinking mindset, sustainability engagement, and perceived problem complexity. This research advances empirical understanding of Design Thinking as an organizational behavior and provides a validated foundation for future scale development and sustainability-focused innovation research.

# The Impact of the Inflation Reduction Act's 1% Excise Tax on Share Repurchases

**Rosemarie McLaughlin**

Faculty Mentor: Dr. Steven Kozlowski, Dr. Mousumi Bhattacharya

Charles F. Dolan School of Business

Booth: 3

**Abstract:**
The impact of the 1% excise tax included in the Inflation Reduction Act of 2022 on share repurchases will be examined. The excise tax was implemented as of January 1, 2023. The government enacted this excise tax to encourage companies to use their excess capital for more investment, research, or employee related expenditures. Consistent with Autore et al. (2025), we determined that the tax did have a significant impact on share repurchases. In addition, the analysis is extended by looking at the effects across industries and profitability subsamples. The analysis will show that not all industries are affected equally and profitable firms are impacted more than less profitable firms. This is consistent with payout policy theory.Regression analysis was run on panel data obtained from Compustat for publicly traded firms for the years 2022 and 2023 considering time, industry, and firm fixed effects in various combinations. All firms and repurchasing only firms were assessed. The excise tax proved to be negatively significant for repurchasing firms in all scenarios, consistent with the excise tax effectively discouraging such firms from engaging in share buyback activity. The excise tax was significantly negative for all firms when adjusting for time and firm fixed effects.The main regression was also run on firms divided into industries using the Fama & French twelve industry classification. Industries that were negatively significantly at the 1% level for both all and repurchasing firms were health, business equipment, chemicals, manufacturing, and consumer nondurables. These industries are less likely to repurchase shares. The industry that was positively significant at the 1 % level was energy. Telecom, for repurchasing firms only, was positively significant at the 5% level. Energy and telecom firms were more likely to repurchase shares. During this time period, energy firms were very profitable and wanted to return capital to shareholders. Telecom firms were going through regulations changes and required investment, so share repurchases were needed to reward shareholders and sustain the stock price.Firms were further divided into high and low profitability subsamples to determine if the excise tax impacted firms with a greater capacity for share repurchases more substantially. The excise tax was negatively significant at the 5% level for high profit firms. It was not significant for low profit firms. These findings indicate that firms with greater profitability are more strongly affected by the excise tax.Overall, the 1% excise tax did decrease the level of share repurchases as intended. Repurchasing firms and profitable firms were more impacted. Most industries saw a significant decline in share repurchases with the exception of Energy and Telecom. Looking at profitable repurchasing firms, the reduction in share repurchases resulted in higher cash balances rather than investing in capital, research and development or employees as policy makers intended. The implication for policy makers is that

the tax can deter unwanted behavior but not encourage preferred behavior. Future work should look at a longer post implementation timeline. At inception, there were discussions about increasing the tax to 4%. This is no longer a priority for the current administration.

# Guided Stewardship: A U.S Based Mixed-Methods Study on Leadership and Management Between Millennial Managers and Generation Z Employees

**Emily Ott**

Faculty Mentor: Dr. Mousumi Bose Godbole, Dr. Mousumi Bhattacharya

Charles F. Dolan School of Business

Booth: 4

**Abstract:**
Traditional leadership models often fail to capture the dynamic and reciprocal nature of contemporary manager and employee relationships, particularly within generationally diverse workplaces. As Millennials increasingly assume managerial roles and Generation Z enters the workforce, leadership approaches must adapt to evolving relational expectations. This dissertation introduces Guided Stewardship; a leadership framework grounded in dyadic relationships that emphasizes how authority shifts based on context.Using a mixed-methods design, this study included 41 qualitative interviews and participant observations with Millennial managers and Generation Z employees. Grounded theory and laddering analysis identified three core attributes of Guided Stewardship: contextual authority, mutual desire to learn, and outside-of-work relationships. These findings informed the development of parallel survey instruments distributed to Millennial managers and Generation Z employees. A prestudy was conducted to assess scale reliability and refine measures through exploratory factor analysis. The final study employed confirmatory factor analysis and structural equation modeling to examine relationships among Guided Stewardship attributes, collaboration, and innovation.Results indicated that collaboration was positively associated with innovation across both cohorts; however, the Guided Stewardship attributes that activated collaboration differed by generation. Mutual desire to learn emerged as the strongest predictor for Millennial managers, whereas contextual authority played a stronger role for Generation Z employees. Overall, Guided Stewardship offers a relational and context-sensitive framework for understanding leadership in the workplace and highlights the importance of dyadic relationships in fostering collaboration and innovation.

# The Impact of Videoconferencing Backgrounds on First Impressions of Warmth & Competence of Working Professionals

**Shilpa Rosenberry**

Faculty Mentor: Dr. Yifeng Fan (Felix Fan), Dr. Mousumi Bhattacharya

Charles F. Dolan School of Business

Booth: 5

**Abstract:**
Amid a broader shift to remote work, video-conferencing has become a standard platform for professional interactions, yet little is known about how videoconferencing backgrounds shape first impressions of colleagues. This dissertation examines how videoconferencing backgrounds influence perceptions of warmth and competence, two fundamental dimensions of social evaluation, among working professionals. Study 1 employed qualitative methods to explore working professionals' background choices and revealed that many make intentional background selections to shape how they are perceived, often choosing neutral or blurred backgrounds to protect their privacy. Female professionals in particular report concealing personal items, especially those perceived as feminine, due to fear of gender bias. Although this phenomenon has not been directly tested in the context of videoconferencing, the insight aligns with prior research on gender and workplace bias. Building on this insight, Study 2 used experimental methods to test the impact of feminine-gendered objects in backgrounds on perceptions of female professionals' warmth, competence and leadership effectiveness. Contrary to expectations, Study 2 found no significant effects, suggesting that other factors may be more influential in shaping virtual first impressions. Additionally, concerns about gender bias from the interviews may reflect anticipatory self-regulation strategies rather than actual bias, offering new insight into virtual impression management. This unexpected result raises important questions about which cues truly influence first impression formation in a virtual environment.

# Regime-Dependent Behavior Of The Fama-French Factors In The Post-COVID Recovery

**Greg Tanner**

Faculty Mentor: Dr Michael McDonald

Charles F. Dolan School of Business

Booth: 6

**Abstract:**
This study examines the persistence of the Fama–French six-factor model before, during, and after the COVID-19 pandemic, evaluating whether traditional risk factors retained explanatory power across distinct macroeconomic regimes. Monthly and daily U.S. equity returns from 1963 through 2025 are analyzed using correlation analysis, difference-in-means testing, and time-series regressions with robust standard errors. Macroeconomic conditions are incorporated through measures of market volatility (VIX), yield-curve slope, breakeven inflation, and the effective federal funds rate to capture regime-dependent variation in factor sensitivities. The market factor (MKT_RF) remains consistently significant across periods, while size (SMB), value (HML), profitability (RMW), and investment (CMA) exhibit weakened or altered behavior following COVID-19. Momentum (MOM) experiences a sharp disruption during the pandemic with partial recovery thereafter. Overall, the findings indicate that factor premia continue to price assets, but the macroeconomic foundations of those premia vary across regimes. The results therefore suggest that while the factor model framework remains empirically effective, the economic interpretation of several factors evolves across periods of significant market disruption. This study incorporates the updated Fama–French dataset and provides evidence on the regime-dependent nature of factor persistence in post-crisis environments.

# Federal Reserve Challenge 2025

**Frank Bertolotti, Kristen McConkekey, Molly O'Neill, Anthony Bongiovanni, Nora Shea, Cole Fabry, Gabriella Fideleo**

Faculty Mentor: Dr. Filippo Massari

Charles F. Dolan School of Business

Booth: 7

**Abstract:**
This project analyzes current U.S. macroeconomic conditions through the framework of the Federal Reserve's dual mandate of maximum employment and price stability. Using data from sources including the Bureau of Labor Statistics, Bureau of Economic Analysis, Federal Reserve Economic Data, and Federal Reserve regional models, the presentation evaluates inflation trends, labor market conditions, GDP growth, and financial stability indicators in order to develop a monetary policy recommendation. Particular attention is given to the persistence of services inflation, temporary tariff related goods inflation, slowing job creation, rising unemployment across demographic groups, and the relationship between the federal funds rate and estimates of the neutral rate of interest. The analysis also compares inflation expectations across households, markets, and Federal Reserve models to assess whether short-term inflation risks remain anchored in the long run. Based on the evidence, the project recommends a 25 basis point reduction in the federal funds rate, arguing that monetary policy remains restrictive while labor market conditions are gradually weakening. The goal of the recommendation is to support continued economic expansion while maintaining progress toward long-run inflation stability.

# Understanding Autonomy in Collaborative Settings: Nuances Between Generation X and Millennials

**Jamie Edwards**

Faculty Mentor: Dr. Mousumi Bose Godbole

Charles F. Dolan School of Business

Booth: 8

**Abstract:**
This study explores how Millennials and Generation X differ in their approaches to collaboration, autonomy, and communication in the workplace. As organizations increasingly rely on multigenerational teams, understanding how these groups navigate collaborative work environments is essential for improving team effectiveness and organizational performance. Prior research suggests that generational cohorts differ in communication preferences, expectations for feedback, and perceptions of independence at work, yet there is limited qualitative insight into how these differences are experienced in collaborative settings.Using a qualitative research design, this study draws on semi-structured interviews with participants from both generational groups across a range of professional roles and industries. The interviews examine how individuals define and experience autonomy, how they balance independence within team settings, and how communication styles and expectations shape collaborative outcomes.Findings highlight key differences in how Millennials and Generation X define and experience autonomy within collaborative settings. Generation X tends to define autonomy as independence, minimal oversight, and ownership of tasks, whereas Millennials view autonomy as flexibility within collaboration, supported by ongoing communication and feedback. These differences are reflected in a process-based model in which generational factors shape how autonomy is enacted through communication patterns, decision-making, and feedback behaviors. The findings further demonstrate that when these expectations are aligned, teams experience greater efficiency, collaboration, and engagement, whereas misalignment leads to perceptions of micromanagement, miscommunication, and reduced performance. By illustrating how autonomy operates as a dynamic process rather than a fixed trait, this study provides practical implications for managing multigenerational teams and improving collaborative outcomes.

# Marketing Wellness to Generation Z: Collegiate Dining as a Case Study in Food, Health, and Sustainability Strategy

**Gianna Greco**

Faculty Mentor: Dr. Camelia Micu

Charles F. Dolan School of Business

Booth: 9

*This research was supported by the Corrigan Scholars*

**Abstract:**
In my thesis, Marketing Wellness to Generation Z: Collegiate Dining as a Case Study in Food, Health, and Sustainability Strategy, I examine how Generation Z constructs perceptions of wellness within collegiate dining environments, positioning dining halls as everyday sites where embedded value systems, credibility, and demonstrated commitment are interpreted. As the first generation to engage with food through a fully digital and information-saturated lens, this cohort evaluates wellness not as a singular attribute, but as a holistic experience shaped by transparency, environmental design, and perceived authenticity.Using a mixed-methods approach, this research draws on a survey of 214 Fairfield University students, twelve semi-structured interviews, and four weeks of structured observational analysis within campus dining facilities. Fairfield University serves as the primary empirical setting due to its alignment with a national Aramark dining framework, while Boston University provides a secondary benchmark through comparative analysis of publicly available dining and sustainability communications.Findings demonstrate that transparency constitutes the central mechanism through which trust is constructed—but only when it is cognitively accessible and embedded at the point of decision. When information is difficult to locate or process, students rely instead on environmental cues such as lighting, layout, and spatial prominence, functioning as implicit signals of healthfulness and perceived intent. Sustainability emerges as an integral dimension of wellness perception; however, its credibility is contingent upon visible, operationalized practices rather than abstract messaging. In institutional dining contexts—where food systems operate at scale and materially shape waste streams, sourcing decisions, and resource consumption—these practices become critical not only for their environmental impact, but as observable signals through which organizations convey accountability and value alignment to Generation Z consumers. Across all data sources, students consistently interpret dining environments as integrated systems in which alignment—or misalignment—among communication, design, and practice shapes broader judgments of reliability.This research advances an integrated “wellness ecosystem” framework, demonstrating that this generation does not respond to isolated initiatives, but to the coherence of the overall experience. The conclusions generate strategic implications for higher-education institutions and food service providers, underscoring the necessity of integrated, experience-driven approaches to wellness, transparency, and sustainability in shaping engagement—insights presented to senior leadership at Aramark. This

study ultimately positions collegiate dining as a critical touchpoint through which organizations communicate authenticity and organizational commitment in ways that extend beyond food itself.

# Impact of Sleep Hygiene Education on Sleep Habits and Anxiety in College Freshmen

**Amy Akerley**

Faculty Mentor: Dr. Jaclyn Conelius

Egan School of Nursing and Health Studies

Booth: 10

*This research was supported by the McGuinness Fund*

**Abstract:**
Sleep is vital for physical, cognitive, and psychological health, yet first-year college students face heightened risks for poor sleep and mental health issues due to stress, shifting routines, academic pressure, and shared living spaces. Despite the benefits of sleep hygiene education, many colleges do not offer it. This quasi-experimental pre-post study integrated a 1-hour sleep hygiene session into the First-Year Experience program. Students completed pre- and post-session sleep hygiene knowledge assessments, with baseline and 1-month follow-up B-PSQI and GAD-7 measures. Sleep hygiene knowledge scores increased significantly from pre- test to post-test, $t(38)= 14.56$, $p < .001$. Sleep quality scores improved slightly but were not statistically significant, $t(21) = -0.70$, $p = .49$. Anxiety scores increased slightly but were not statistically significant, $t(22) = 0.56$, $p = .581$. At 1-month follow-up, all respondents reported using at least one sleep hygiene strategy learned from the session and that other students would benefit from this education. A single in-person sleep hygiene session significantly improved knowledge but did not change sleep quality or anxiety, possibly influenced by follow-up occurring near midterm examinations. Incorporating sleep hygiene education into a First-Year Experience program may be a practical way to support student wellness.

# Using Visual Aids to Increase DLQI Documentation Compliance Among Dermatology Providers in Acne Patients

**Laina Campos**

Faculty Mentor: Janina Gilo-Tomkins, DNP, APRN, FNP-C

Egan School of Nursing and Health Studies

Booth: 11

*This research was also presented at the National Organization of Nurse Practitioner Faculties 52nd Annual Conference 2026*

**Abstract:**

**Background:** Acne is a widespread dermatological condition that influences a patient's quality of life (QoL), affecting their psychological, social, and physical well-being. The Dermatology Life Quality Index (DLQI) tool is a standardized questionnaire used to evaluate the ways in which dermatological diseases, such as acne, affect the everyday life of the patient. Although its routine use is supported in the literature, documentation of DLQI is inconsistent in clinical practice due to reasons such the absence of standard workflow, lack of visual reminders, and provider forgetfulness. Objective: This project aims to standardize use of the DLQI for acne patient visits and increase documentation compliance using a variety of visual aids implemented into an outpatient dermatology clinic workflow.

**Methods:** This quality improvement project was conducted over a 6-week period utilizing three Plan-Do-Study-Act (PDSA) cycles for practice improvement. Interventions included a provider education session, phased placement of visual aids in strategic clinical locations, and integration of DLQI Yes/No prompt into the acne visit EMR template. Chart reviews were performed every two weeks following each PDSA cycle to assess DLQI documentation compliance. Data were collected from 15 acne visits per cycle, totaling 45 visits, and compliance rates were compared across cycles to evaluate intervention effectiveness.

**Results:** A total of 45 acne patient visits were evaluated across three PDSA cycles. DLQI documentation compliance improved progressively throughout the intervention period. In Cycle 1, compliance was 46% (7/15 visits) following provider education and placements of visual aids in the staff office. In Cycle 2, compliance increased to 66% (10/15 visits) after visual aids were added to both the staff office and exam rooms. In Cycle 3, compliance reached 93% (14/15 visits) following the addition of an EMR-integrated DLQI Yes/No prompt alongside existing visual aids. Overall, 68.9% of visits (31/45) included documented DLQI scores during the six-week intervention period. The greatest improvement occurred in Cycle 3, demonstrating that EMR integration combined with visual aids resulted in the highest documentation compliance and achieved the project goal of ≥ 90% compliance.

**Conclusions:** By standardizing DLQI use in acne visits, this project promotes evidence-based, patient-centered care that strengthens communication and enhances treatment planning. The

strategic use of visual aids and EMR workflow integration significantly improved DLQI documentation compliance. As routine use of the DLQI tool increases, providers may be better able to assess the impact of acne and its treatment on patients' QoL with pre- and post-assessments.

**Description of Project:** This quality improvement project aimed to standardize the use of the Dermatology Life Quality Index (DLQI) during acne visits in an outpatient dermatology clinic to increase documentation compliance by dermatology providers and support patient-centered care. Over a six-week period, three Plan-Do-Study-Act (PDSA) cycles were implemented, including provider education, placement of visual reminders in clinical areas, and integration of a DLQI Yes/No prompt into the electronic medical record (EMR). Chart reviews of 45 acne visits demonstrated progressive improvement in DLQI documentation compliance from 46% to 93%, achieving the project goal of ≥ 90% compliance rate. Ultimately, findings suggest that combining visual aids with EMR workflow integration is an effective strategy to enhance consistent use of standardized quality-of-life (QoL) assessments in dermatology practice.

# DQSA Title I: A Retrospective Health Policy Analysis of Sterile Compounding Regulation

**Mary Ellen Casey, DNP candidate, Bridget Belfiore, MEPN, Lauren Pavarini, MEPN, Krista Schultz, MEPN**

Faculty Mentor: Lisa Sundean, PhD, MHA, RN

Egan School of Nursing and Health Studies

Booth: 12

**Abstract:**

**Background:** The 2012 fungal meningitis outbreak linked to contaminated steroid injections from the New England Compounding Center exposed significant regulatory gaps in sterile compounding oversight, resulting in more than 800 infections and 64 deaths across 23 states. Investigations revealed unsafe production practices and unclear jurisdictional authority between state regulators and the U.S. Food and Drug Administration, prompting enactment of Title I of the Drug Quality and Security Act (DQSA). Title I clarified federal oversight, established the 503B outsourcing facility category, and strengthened reporting and compliance requirements to improve drug quality and accountability nationwide.Purpose: The purpose of this health policy analysis was to evaluate the effectiveness of Title I of the Drug Quality and Security Act (DQSA) in addressing the regulatory failures revealed by the 2012 fungal meningitis outbreak, examine regulatory gaps, and compare it with Massachusetts reforms and United States Pharmacopeia (USP) national standards. A local focus, the outbreak source, assisted in determining the most effective policy approach for ensuring safe, sterile compounding in the state of Massachusetts. This analysis sought to identify the most comprehensive and sustainable regulatory approach to strengthen compounding oversight, reduce contamination risk, and restore public trust in drug safety.

**Methods:** A retrospective approach with a modified PESTEL analysis was the method used for this project. Components of the analysis included identification of the problem, socio-historical background, stakeholder analysis, values analysis, policy solutions alternatives, policy alternatives analysis, and feasibility analysis. Guided by the Bardach & Patashnik Eightfold Path Model, the analysis defined the policy problem, assembled relevant evidence, developed and evaluated policy alternatives using explicit criteria, evaluated anticipated outcomes and competing trade-offs, and determined the most feasible recommendation. A power analysis and decision matrix supported policy recommendation.

**Results:** The policy analysis indicates that DQSA Title I strengthened FDA regulatory authority and created a national framework, but problems with access, cost, quality, and equity remain. Massachusetts' 2014 policies, Chapter 159 and §39F of Chapter 112, provide implementation details and licensing standards, and USP gives specific, evidence-based sterile compounding requirements. USP achieves the highest effectiveness in promoting sterile compounding safety, particularly when integrated with strengthened state oversight. Conclusion/Implications: The

analysis recommends maintaining DQSA Title I as the national regulatory foundation while prioritizing robust Massachusetts enforcement and full adoption of USP  standards. This combined approach best addresses contamination risk, enhances regulatory consistency, and restores public trust in compounded medication safety.

Selected References

113th Congress, 2013-2014 Session. (2013). Drug quality and security act, H.R. 3204. https://www.congress.gov/bill/113th-congress/house-bill/3204247 CMR Board of Registration in Pharmacy. (2023, January 12). 247 CMR 17.00: Sterile compounding. Mass.gov. https://www.mass.gov/doc/247-cmr-1700-sterile-compounding/downloadPorche, D. J. (2023). Health policy (3rd ed.). Jones & Bartlett LearningSession laws, chapter 159. (2014). The 194th General Court of the Commonwealth of Massachusetts. https://malegislature.gov/Laws/SessionLaws/Acts/2014/Chapter159U.S. Pharmacopeia [USP]. (n.d.). General chapter. https://www.usp.org/compounding/general-chapter-797

# Effects of Dog-Assisted Therapy Session Duration on Perceived Stress in College Students

**Maria  Bellos, Daniella Suarez, Riley Raposa**

Faculty Mentor: Dr. Kimberly Doughty, Dr. Audrey M Beauvais

Egan School of Nursing and Health Studies

Booth: 13

**Abstract:**
Animal-assisted therapy, particularly dog-assisted therapy, has been widely studied as a non-pharmacological intervention for stress reduction. Interacting with therapy dogs has been associated with decreased physiological stress markers (such as cortisol), reduced self-reported anxiety, and improved mood in a variety of populations. In university settings, brief interactions with therapy dogs have consistently demonstrated benefits, including lower perceived stress, reduced test anxiety, and improved emotional well-being. These programs are increasingly used on university campuses as a low-risk, accessible method to support student mental health. Although dog-assisted interventions are widely used to support student well-being, little research has examined whether different “doses” of interaction produce different outcomes. To address this gap, we designed a randomized controlled trial in which eligible students were assigned to one of four groups: 5-minute, 10-minute, or 20-minute dog-assisted therapy sessions, or a 10-minute aromatherapy control condition. All participants completed brief self-report measures of perceived stress and sense of belonging at the University immediately before and after their assigned session. The study was approved by the Institutional Review Board, and informed consent was obtained from all participants. We hypothesized that all dog-assisted therapy groups would show reductions in perceived stress relative to the aromatherapy condition, with greater decreases associated with longer durations. Findings from this project may inform evidence-based guidelines for optimizing session length in campus-based dog-assisted therapy programs.

# Lactation Friendly States: How does where you live affect your access to breastfeeding supportive policies and practices?

**Catherine Fitzgerald**

Faculty Mentor: Dr. Jennifer Schindler-Ruwisch

Egan School of Nursing and Health Studies

Booth: 14

*This research was also presented at the Academy of Breastfeeding Medicine Annual Conference*

*This research was supported by the McGuinness Fund*

**Abstract:**

**Background:** Federal Title IX law that protects all gender identities from discrimination was recently expanded to include institutions of higher education, but then the law was vacated in 2024 and no longer enforced. Since then, institutions of higher education have responded in very varied ways to protect pregnant and lactating students and staff. Across the country, differences in access to lactation accommodations and Baby Friendly Hospitals can impact breastfeeding rates. The purpose of this study was to better understand state and regional differences in lactation policies that may influence breastfeeding.Methods: A systematic review of policies by state was undertaken, with a particular focus on three New England states with comparable geographic sizes: Vermont, New Hampshire and Connecticut. These lactation policies were compared with breastfeeding initiation and duration rates by state to understand associations.

**Results:** There are currently 489 Baby Friendly designated hospitals across the nation, with eight facilities in CT, only one in the entire state of VT, and six with this recognition in NH. Additionally, not all are centrally located/accessible. In terms of campus-wide policies, there are also vast differences with only some of the public universities promoting lactation policies publicly in VT, a mix of public and private universities with “Breastfeeding Friendly Campus” policies in CT, and in NH, lactation policies at public universities are published, but at several private institutions they are specified only for employees. In 2023, breastfeeding initiation rates in CT were 87.4%, 90.8% in NH, and 91.3% in VT. In CT, 26.3% were exclusively breastfeeding at 6 months; compared to 31.8% in NH and 36.2% in VT.

**Conclusion:** There are wide variations in lactation supportive policies across states that may impact breastfeeding rates, even in states with above average sustained breastfeeding. Understanding the impact of lactation policies on breastfeeding rates is critical.

# Miscarriage Grief: "The Loss of a Child That Did Not Live Outside Our Body"

**Kimberly Watson**

Faculty Mentor: Dr. Jennifer Ruwisch, Dr. Christine Denhup

Egan School of Nursing and Health Studies

Booth: 15

*This research was also presented at the Sigma Theta Tau Region 15 Research Symposium 2025*

*This research was supported by the McGuinness Fund*

**Abstract:**

**Background:** Miscarriage is a common experience worldwide. Research prioritizes physical over mental health effects of miscarriage. Recognition of psychological consequences and grief are rare. Society's marginalization of miscarriage grief contributes to perceived ostracism. Further exploration of miscarriage grief and supportive needs is warranted to advance the science and inform evidence-based practices that can support grieving individuals.Purpose: The purpose of this study was to understand the experience of miscarriage grief among childbearing people.

**Method:** For this mixed-methods study, researchers used a Qualtrics survey to gather data from an international convenience sample of 1,709 childbearing participants who met the following eligibility criteria: English-speaking, over age 18 years, and experienced miscarriage within the last 10 years. SPSS was utilized to analyze quantitative data and Dedoose for qualitative responses, implementing standard coding techniques and thematic content analysis from which common themes emerged.

**Results:** Miscarriage was described as "the loss of a child despite the fact that the child did not live outside our body." Most participants (84.7%) felt somewhat/very supported by family/friends; of these, 85.3% did not seek peer support. Among those reporting low/limited support, few (17.9%) sought out peer support, which was statistically significant, $\chi 2$ (4, n = 1487) = 17.14, p = 0.002. Those who reported religion/spirituality as being helpful were significantly less likely to receive professional mental health counseling, $\chi 2$ (2, n = 694) = 6.38, p = 0.041. Participants offered recommendations to health professionals related to loss acknowledgement, facility design, access to care, communication, grief support, and grief training.

# Incluyendo Voces: Identity, Belonging, and the Heritage Spanish Learner

**Maria Arroyo**

Faculty Mentor: Dr. Sergio Adrada-Rafael

School of Education & Human Development

Booth: 16

**Abstract:**
Planning Spanish language instruction in the United States has become increasinglycomplex due to the growing linguistic diversity of students, particularly the rising number of heritage Spanish learners. Leeman (2020) describes heritage Spanish learners as a heterogeneous group with diverse linguistic experiences and abilities, ranging from Spanish-dominant first-generation immigrants who arrived in the U.S. at an early age to third-generation immigrants with limited Spanish speaking abilities who grew up speaking or hearing Spanish at home or in their communities. The core issues are that Spanish language instruction in the United States has not adapted to the increasing presence of heritage Spanish learners, resulting in curricula that often exclude their linguistic realities and cultural identities, thereby undermining both their cultural understanding and the broader diversity of the Spanish-speaking world. This study investigates how resource disparities, language standardization, and classroompower dynamics shape heritage Spanish learners' sense of belonging and linguistic confidence. Drawing on Critical Language Awareness (CLA) as an interpretive framework, it analyzes how language functions as a social practice through which power, ideology, and identity are constructed and negotiated within the Spanish Language classroom (Beaudrie et. al., 2020). Additionally, CLA emphasizes that language learning is not neutral but is deeply embedded in social, political, and cultural context for Spanish language learners, especially those from marginalized or bilingual communities. By recognizing the linguistic and cultural diversity of heritage Spanish speakers through a CLA lens, instructors can create a curriculum that recognizes the linguistic and cultural diversity of Spanish speakers in the United States.

# Using Motivational Interviewing as an Academic Intervention with Marginalized College Students

**Dawn DeBiase**

Faculty Mentor: Dr. Jay Taylor

School of Education & Human Development

Booth: 17

*This research was supported by the Albert M. Loch Fund*

**Abstract:**
This study examined the impact of individually-administered Motivational Interviewing (MI) sessions in an academic context and hypothesized that MI is uniquely positioned to increase behaviors that lead to improved academic performance among college students who have experienced marginalization due to race, socioeconomic standing, or first-generation status. A case study design was utilized, with four female Latinx participants. Individual meetings were conducted with each participant, incorporating the four critical MI process of engagement, focusing, evoking, and planning. Anchored by the hypothesis, three specific research questions guided this study. Research Question #1 (What happens to participants' grades when MI is used as an intervention?) considers participants' grades. Results indicate that three of the four participants significantly improved their grades at the conclusion of the semester and were able to able to continue to improve academically in subsequent semesters. Research Question #2 (How do participants respond to specific MI interventions in an academic context?) investigates how participants behave in the context of the intervention. Deductive analyses suggested that participants responded to specific MI techniques (Reflections, Affirmations, Summaries, Providing Information, and Evoking Change Talk) in ways that were predictable. Specifically, participants engaged more intentionally, continued the conversation with the researcher, reflected deeply, readily acknowledged recent academic successes, discerned behaviors toward achieving their academic goals, and used change talk which is associated with actual behavior change. Inductive analyses revealed three salient themes pertaining to improving their academic performance: relationships (with the researcher, with professors, and with family) opportunity (related to being first-generation status, seizing opportunities to make their families proud, and the employment of tenacity and grit to achieve goals) and the expression of attitudes (confidence, empathy, and gratitude). Research Question #3 (How do participants perceive their experience of an MI style of communication?) explores the MI intervention from the perspective of the participants. The Client Evaluation of Motivational Interviewing (CEMI) indicated that participants believed that the researcher had successfully evoked feelings of hope, confidence, and need to make behavior changes in their academics. Furthermore, participants perceived the relationship with the researcher as a collaborative partnership, respectful of their autonomy. End-of-semester interviews were conducted with each participant. Inductive analysis of the interviews indicated that all participants found the experience of the MI intervention advantageous. Unanimously,

participants expressed their belief that the meetings with the researcher positively influenced their academic performance.

Results indicate that the study's hypothesis was partially supported. Participants reported and successfully utilized a myriad of specific behaviors (including, but not limited to, asking for help, increasing study time, and working fewer hours). For the majority of participants, these behaviors influenced improved academic outcomes.

Future research is encouraged with students occupying the same intersectional marginalized identities to cull more data to substantiate the effectiveness of MI as an academic intervention with this specific population. The use of MI as an individually-administered academic intervention should also be utilized, and its effectiveness measured, with other marginalized student groups (such as first-generation Black students).

# From Inquiry to Empathy: Impacts of a Transformative Learning Theory Holocaust Curriculum

**Jill Feltus**

Faculty Mentor: Dr. Emily Smith, Rev. John Savard, S.J.

School of Education & Human Development

Booth: 18

*This research was also presented at the National Council of Teachers of English, Fall 2026*

**Abstract:**
This dissertation explored whether a Transformative Learning Theory (TLT) and Building Thinking Classrooms (BTC)-framed Holocaust curriculum could expand high school students' understanding of Jewish identity, foster prosocial attitudes, and support social-emotional development. Using a mixed-methods convergent design, pre- and post-instruction survey data were analyzed alongside focus group discussions and a researcher's reflective journal. Findings revealed that the instructional method significantly broadened students' knowledge, moving them from a trauma-centric 'Holocaust lens' to a multifaceted understanding of Jewish identity as a complex religious, ethnic, and cultural spectrum. Quantitatively, the most dramatic shift occurred in students' rejection of blind obedience to unjust laws, reflecting a move toward greater moral autonomy. While survey data documented an unexpected decrease in consensus regarding religious tolerance, qualitative data complicated this finding; students demonstrated increased empathy, humanized perspectives, and a deepened respect for Jewish resilience through collaborative work with primary sources and immersive media.

This research highlights the efficacy of a student-directed pedagogy to sensitive, often human-centered content. It suggests that when educators move from a teacher-directed model to a student-directed approach, students can successfully navigate complex content, revise misconceptions, and experience meaningful transformative learning without the risk of content misunderstanding often feared by practitioners.

# HELPING UNDERGRADUATE STUDENTS FIND THEIR GLOBAL SELVES: THE SEARCH FOR TRANSFORMATIVE LEARNING AND HIGH-IMPACT PEDAGOGIES

**Julie Mughal**

Faculty Mentor: Dr. Kathy Nantz, Dr. Emily Smith

School of Education & Human Development

Booth: 19

*This research was also presented at the Global Initiatives in Refugee and Migrant Education*

**Abstract:**
This study was conducted to determine if there are high-impact practices that can be used in undergraduate classrooms to promote a global consciousness and a sense of global responsibility among undergraduate students. The literature review informed the research by exploring the conceptual history of global consciousness and its intersection with transformative learning theory and high-impact pedagogies (HIP). The research employed a mixed-method approach that triangulated data and findings from different data streams to capture the impact of specific course assignments and pedagogies. It focused on two fundamental questions: 1. Are there "catalysts for transformative learning"—activities, pedagogies, or something that students learned, did, or cared about in classes or co-curricular activities that sparked a global consciousness and a sense of responsibility to the world community? and 2. How did alumni of the humanitarian action program describe the ways their global consciousness and sense of responsibility were integrated into their post-graduate life or profession? The results of this study are important for educators to steward a global consciousness and sense of responsibility in university students, especially during a time of increased nationalism and isolationism and a growing global cynicism towards multilateralism. As the international studies and humanitarian action fields confront this new reality, it is more important than ever to discern which pedagogies or transformative classroom experiences will encourage a student to embrace a global consciousness and to transform this consciousness into action. This study provides a pathway for educators to implement the identified transformative practices with their students and to continue to explore ways to instill college students with a sense of global awareness and responsibility.

# Navigating the Educational Shift: An In-Depth Analysis of the Intersection of Male Enrollments and Program of Study

**Kristen Smith**

Faculty Mentor: Dr. Richard A. Greenwald, George A. Peffer, D.A.

School of Education & Human Development

Booth: 20

**Abstract:**
The decline in male higher education enrollment in the United States, a trend shaped by intersecting demographic, economic, cultural, and institutional forces, was examined in this study. Although national data show widening gender disparities in college participation, less is known about how these patterns manifest in specific institutional contexts or how men interpret the pressures influencing their educational decisions. Guided by four research questions, this mixed methods study explored the factors contributing to declining male enrollment, the gendered distribution of students across academic disciplines, and the implications of these shifts for institutional strategy and equity in higher education. Quantitative analysis of institutional enrollment data at North Central University (a pseudonym) identified persistent gender imbalances across several academic programs, with men underrepresented in fields requiring sustained academic preparation and overrepresented in disciplines aligned with vocational pathways. Qualitative data were drawn from preexisting admission essays submitted by male students, which further illuminated how financial pressures, labor market expectations, cultural norms surrounding masculinity, and perceptions of academic fit shape men's postsecondary choices. Participants described college as valuable but often misaligned with immediate economic responsibilities, contributing to delayed enrollment or the pursuit of alternative pathways. This study interpreted both the overall decline in male enrollment and men's concentration in vocationally oriented majors as negative trends, given their long-term implications for economic mobility, civic participation, and access to the broader intellectual and professional opportunities associated with a 4-year degree. These patterns also raise equity considerations, as they may shape men's long term economic opportunities and influence the diversity of perspectives represented across academic disciplines and future professional fields. Findings suggested that reversing or narrowing gender disparities will require coordinated institutional responses that address both structural barriers and gendered cultural attitudes toward higher education. Recommendations included strengthening career-aligned advising, expanding early academic preparation, and developing targeted outreach strategies for men in underserved communities. This study contributed to a growing body of research on gender and enrollment by offering institution-specific insights that can inform more equitable practices and policies in higher education.

# Women in K-12 Leadership: Exploring Influences, Perspectives and Views on the Journey to the Superintendency

**Meghan Troy**

Faculty Mentor: Dr. Anna Cutair

School of Education & Human Development

Booth: 21

**Abstract:**
Despite representing approximately 77% of the national teaching force and holding the majority of advanced credentials in educational leadership, women occupy only 30% of superintendencies nationwide. This doctoral research, “Women in K-12 Leadership: Exploring Influences, Perspectives and Views on the Journey to the Superintendency,” investigates this persistent gender disparity within the highest position of school governance, the superintendency. Framed by Social Role Theory and Role Congruity Theory, the study examines how internalized perceptions of leadership and the disproportionate burden of domestic mental labor influence a woman’s decision to pursue or self-select out of the leadership pipeline.

Centered on the lived experiences of female district administrators and sitting superintendents in the tri-state region, this research addressed two essential research questions: 1) How does a woman's view of leadership impact her decision to pursue the superintendency? 2) What impact does mental labor, cognitive and emotional, have on a woman’s entry into the superintendency? The findings suggest that highly qualified women often opt out of the leadership pipeline due to a perceived conflict between their relational leadership identities and the "all-consuming," highly political nature of the role. Furthermore, the data reveals a significant misalignment between the perceived demands of the office held by aspiring leaders and the actualized experiences of sitting superintendents. The study offers strategic recommendations to mitigate these systemic inequities and cultivate a more inclusive leadership journey.

# “Experiencing Barriers:” The impact of a social model-based disability simulation on a university campus:

**Christopher Lyons, Madeleine Babcock**

Faculty Mentor: Dr. Emily Shamash, Dr. Alyson Martin

School of Education & Human Development

Booth: 22

**Abstract:**
In higher education, diversity, equity, and inclusion (DEI) initiatives are common practice in order to create inclusive environments for all students of traditionally underrepresented and marginalized backgrounds. However, when it comes to disabled students, disability is not necessarily included in diversity initiatives on college campuses. Instead, disability is treated as an individual problem to be managed by students and siloed offices for disabled students. In this presentation, social barriers that lead directly to the exclusion of disabled students on college campuses, such as attitudinal barriers and microaggressions are explored. Medical and social models of disability are discussed, and an approach to disability simulations grounded in the social model is explored. A pilot study will be presented with suggestions for future practice and implications across campuses.

# Adult Adoptees' Experiences and Satisfaction with Marriage and Family Therapy Treatment: Exploring Stressors, Needs, and Resilience

**Madison Birsh**

Faculty Mentor: Dr. Carissa D'Aniello-Heyda

School of Education & Human Development

Booth: 23

**Abstract:**
Marriage and family therapists are specifically trained to treat families, yet little attention has been focused on family dynamics specific to adoptive families. One in five MFTs work in adoption and foster care agencies and yet less than 5% of COAMFTE accredited marriage and family therapy programs offer coursework or formal training on treating adoptive families (Gardenhire et al., 2019; Weir et al., 2008). Adoptees are often in social environments that are not understanding of their unique needs and experiences (Lee Small, 2025). Since adoptive families may experience little support in their peer networks, it is critical that therapists are trained to provide competent care (Baden, 2016; Lee Small, 2025). While treatment of adoptive families has been emphasized in research, these efforts tend to focus on attachment in adopted children and adolescents (Barth et al., 2005; Carnes-Holt, 2012; Forbes & Post, 2006; Gardenhire et al., 2019; James, 1994; Lacher et al., 2012; Purvis et al., 2007; Raby & Dozier, 2019; VanFleet & Sniscak, 2003) and intervention techniques aimed to foster secure attachments between adoptee and adoptive parent (Barbato et al., 2020; Carnes-Holt, 2012; Hewitt et al., 2018; Lacher et al., 2012; Machemer et al., 2025; Purrington et al., 2024; Stokes & Poulsen, 2014; Weir et al., 2013). Much less research inquiry has focused on the experiences of adoptees and their ongoing therapeutic needs (Branco et al., 2025; Lee Small, 2025). Therefore, the aim of the present study is to develop a nuanced and timely understanding of the needs of adoptive families. Using transcendental phenomenology (Moustakas, 1994), this study will examine the lived experiences of adopted persons who received marriage and family therapy treatment. Anticipated findings of the present study may include core themes around adoption and the therapeutic experience, unmet therapeutic needs across later developmental stages, and meaningful variation in therapeutic experiences based on adoption type, suggesting that adoption-competent frameworks and clinician training must account for this diversity. These findings have implications for MFT training, clinical practice, and future research.

# A Mental Health Deep Dive with the Town of Greenwich, CT: Analyzing Trends and Service Gaps

**Jennifer Bissell**

Faculty Mentor: Dr. Julie Berrett-Abebe, Dr. Joseph DeLuca

School of Education & Human Development

Booth: 24

*This research was supported by the Center for Social Impact Fellowship*

**Abstract:**
This research is affiliated with the Greenwich United Way (GUW).This research was supported by Rei Gonzalez and the Fairfield University Center for Social Impact Community-Based Research Team.In follow-up to a 2020 needs assessment, Greenwich United Way partners with the Fairfield University Center for Social Impact to conduct a comprehensive assessment of community needs. Deep dive teams in the 2025 study explore priorities from previous needs assessment, including: housing, early childhood education and mental health. This research focuses on the mental health team and identifies critical gaps related to mental health and substance use disorders within the Town of Greenwich to provide actionable insights for strategic planning and advocacy. While survey results rank mental health as the second most significant community concern, qualitative interviews with school administrators, clinical staff, and the general public reveal a complex landscape. Although the region possesses robust behavioral health assets, significant barriers remain regarding affordability and accessibility, including long wait times and a prevalence of "private pay only" providers. Furthermore, while quantitative data suggest relatively low rates of community mental health stigma on average, some gaps in mental health knowledge appear to persist. More specifically, qualitative data uncovers "layered stigma" uniquely tied to local socio-economic status and high social expectations. To address these challenges, researchers recommend mental health literacy campaigns that center the voices of service utilizers, alongside the co-location of services in community hubs like libraries and houses of worship. These findings serve as a blueprint for Greenwich United Way to prioritize innovations such as funded care coordination and philanthropic support for psychopharmacology, ensuring a more equitable and coordinated system of care for all residents.

# Data Accessibility and Analytics Support for "Room at the Table: Increasing Civic Participation in Local Land Use Decision-Making Report"

**Luis Quechol Arias, Kevin Hanson**

Faculty Mentor: Mr. Reinaldo Gonzalez

School of Education & Human Development

Booth: 25

*This research was supported by the Center for Social Impact Fellowship*

**Abstract:**
This project examines disparities in civic participation within local land use decision-making in Fairfield County, Connecticut. The Center for Social Impact (CSI) partnered with The Housing Collective (THC) to enhance data analysis and accessibility capacity for the report, “Room at the Table: Increasing Civic Participation in Local Land Use Decision-Making.” Using data provided by THC, CSI developed interactive visualizations in Tableau. These included a geospatial analysis of the county boards to translate member data into easy-to-understand and interactive visuals for a wide range of audiences. The analysis focused on the demographic composition of Planning and Zoning Commissions as well as Zoning Boards of Appeal to assess whether these public boards of residents reflect the communities they serve. Findings reveal substantial representation gaps. While Fairfield County is 49% male and 58% white, its land use boards are composed of 70% male members and 94%white members. Consequently, 91% of board members are homeowners, and the median age is 61, with renters and younger residents significantly underrepresented. Beyond demographic disparities, the study identifies structural and operational barriers to participation. High time commitments and limited institutional support create barriers that disproportionately exclude individuals with greater economic and scheduling constraints. As a result, findings were transformed into a meaningful tool, designed to engage the Fairfield County community in critical conversations about civic participation and the democratic nature of land-use decision-making.

# Amplifying Resident Voices Project: Examining the effects of violence on public housing residents

**Ana Aguirre, Elizabeth Biggs**

Faculty Mentor: Mr. Reinaldo Gonzalez

Meditz College of Arts & Sciences

Booth: 26

*This research was supported by the Center for Social Impact Fellowship*

**Abstract:**
Gun violence and structural violence disproportionately affect residents of public housing communities, with lasting consequences for resident health and wellbeing. The Amplifying Resident Voices project, a collaboration between PT Partners, Catalyst CT and Fairfield University's Center for Social Impact, aims to identify community-based intervention strategies that center resident participation and address the structural roots of urban violence. An evidence-based approach prompted the development of a literature review aimed at synthesizing peer reviewed empirical studies, narrative reviews, and program and organizational websites to examine three core questions: what is known about violence in public housing and what interventions have been implemented; how outcomes differ between perceived and directly experienced violence and what that means for behavior, mental health, and wellbeing; and how community engagement shapes the effectiveness of violence prevention efforts. Findings indicate that violence in public housing extends beyond criminal events to include environmental, structural, and psychosocial dimensions. Community-led interventions, including youth programming, neighborhood remediation, and trauma-informed approaches, consistently outperform policing-centered strategies, which often leave residents more fearful and less trusting of the institutions meant to serve them. Perceptions of violence, shaped by historical trauma, visible disorder, and media narratives, emerge as a distinct pathway influencing health outcomes independent of actual crime rates. Meaningful resident participation emerges as central to whether interventions succeed or fail.

# Restoring the Táin Bó Cúailnge: Reading Irish Myth Through The Lens of Prehistoric Celtic Gender Norms

**Ciara Weber**

Meditz College of Arts and Sciences

Faculty Mentor: Dr. Upasana Dutta

Booth: 27

*This research was supported by the Humanities Institute Research*

**Abstract**
All surviving manuscripts of the Táin Bó Cúailnge, the central epic of the Irish Ulster Cycle, were recorded by Catholic monastic scribes centuries after the tales are believed to have been composed in the oral tradition. Due to the evidence of ethnocentric and religiocentric attitudes towards pre-Christian Irish Celtic mythology, in combination with the greater emphasis placed on gender, sexual promiscuity, and morality by the Catholic church in this time period, the manuscripts indicate modifications to the original oral tradition. This research aims to reinterpret the Táin Bó Cúailnge within the scope of gender, sex, and sexuality in order to gain a greater understanding of the possible gender norms of pre-Christian Irish Celtic societies, specifically through studying the role of female characters in the text as a means to identify the roles of women in these societies at large.

# Arts and Community-Engagement: How University Museum and Art Centers Directors and Outreach Specialists Engage Communities in Arts Programming

**Sara Useche, Ana Aguirre, Katherin Garcia-Flores**

Faculty Mentor: Mr. Reinaldo Gonzalez

Meditz College of Arts & Sciences

Booth: 28

*This research was supported by the Center for Social Impact Fellowship*

**Abstract:**
Higher education institutions and cultural centers such as museums occupy a pivotal role at the intersection of knowledge creation and community engagement, extending their influence beyond traditional academic boundaries. Notably, the arts serve as powerful vehicles for such engagement, inviting participation and dialogue and spaces for cultural exchange. Many arts outreach programs and initiatives remain underutilized in both the civic and academic setting despite their potential to assist in the rebuilding of community social capital. This report investigates the dual responsibility of university art centers to support cultural and intellectual life on campus while also engaging and contributing meaningfully to the surrounding community through community arts programming. By examining the practices and initiatives employed by universities arts centers, this study highlights how these centers have leveraged community engagement to achieve greater social impact, increase program engagement and audience turnout, and curate meaningful experiences. Through a review of the literature and interviews with museum and arts education and outreach specialists from three university museums, this report explores best practices in arts education outreach, aiming to identify strategies that address barriers and enhance these collaborative opportunities. Central to this exploration are two key questions: What practices do museums and art centers employ in arts education outreach to best connect with the surrounding community? And how can higher education institutions leverage their power, knowledge, and resources to amplify the positive impact of their arts programming within the surrounding community? The findings aim to inform and inspire more robust community engagement initiatives within our college campus and beyond.

# Risk Perception and Algorithm Aversion: A Study of AI-Generated Advice in Wealth Management Context

**Dean Mills**

Faculty Mentor: Dr. Keh-Kuan Sun

Meditz College of Arts & Sciences

Booth: 29

*This research is affiliated with Sigma Xi*

**Abstract:**
This study investigates whether algorithm aversion is driven by a subjective perception of AI advice as inherently riskier (higher variance) than human advice. Recent studies report a human premium over AI content in various domains. A particular study documents that human premium decreases under loss framing. Drawing on prospect theory, this pattern is consistent with risk-seeking behavior in the face of perceived high-variance options.The experimental design employs a 2x2 factorial between-subjects approach, crossing gain/loss framing with a pay-before-see vs. see-before-pay manipulation. This structure identifies whether the valuation gap is driven by ex-ante risk perceptions (uncertainty unresolved) or a blanket source preference (uncertainty resolved). Participants engage in a multi-stage investment task, including:

- Stage 1: Eliciting baseline risk preferences using the Eckel and Grossman (2002) instrument.
- Stage 1.5: An incentivized belief elicitation of subjective probability distributions over AI versus human recommendation quality to test for inherent variance perceptions.
- Stage 2: Portfolio construction and Multiple Price List (MPL) valuation of matched advice from both AI and human sources.

By correlating individual risk aversion with the WTP (Willingness-to-Pay) gap between human and AI sources, this study aims to provide evidence that algorithm aversion is mediated by risk perception. Results will clarify if "aversion" is a fixed bias or a rational response to perceived volatility, offering critical insights for the integration of AI in high-stakes financial decision-making.

# Apollon eJournal

**Autumn Bartush, Katelyn Richardson, Emily Garry, Olivia Ambrosio, Matthew Celentano, Therafi Lin**

Faculty Mentor: Dr. Shannon Kelley

Meditz College of Arts & Sciences

Booth: 30

**Abstract:**
At "Apollon," we strive to publish superior examples of undergraduate humanities research from a variety of disciplines as well as intellectual approaches. We are an undergraduate digital journal in the humanities focused on producing annual issues of excellent, peer- reviewed work from college and university students across a range of disciplines. "Apollon" accepts essays/articles/digital projects developed from graded work written for a course or independent study related to (but not limited to): English and Foreign Languages; Literature; Art and Design History, Music History, Theater History, Film Studies; History and Classics; Philosophy and Religion; Peace and Social Justice Studies, Women's and Gender Studies, and Regional Studies, and qualitative and theoretical work in the social sciences.

# Marriage in A Midsummer Night's Dream and Othello: For Better or For Worse

**Grace Danielewicz**

Faculty Mentor: Dr. Shannon Kelley

Meditz College of Arts & Sciences

Booth: 31

*This research was also presented at the The Shakespeare Association of America's Annual Meeting*

*This research was supported by the Lawrence Family Fund*

**Abstract:**
Many readers view marriage as a joyful union of two individuals who love one another. With elaborate outfits and wedding bells ringing, it is easy to perceive marriage as a cause for celebration. This is typically how weddings function in Shakespearean plays, particularly in the finale of comedies. Marriage is a symbol of permanence that provides a safe space for channeling the sexual desires of the characters as well as providing a hopeful and innocent future for the characters that the audience have grown to love. However, a darker and more foreboding perspective of marriage is displayed in both A Midsummer Night's Dream and Othello. A Midsummer Night's Dream ends with three marriages; Hermia marries Lysander, Helena marries Demetrius and Theseus marries Hippolyta. While on the outside this may be viewed as a flawless happy ending where "The man shall have his mare again, and all shall be well" (3.2.463), everything is not as perfect as it seems. Othello begins with the elopement of Othello and Desdemona but ends in tragedy with the deaths of three married characters; Othello, Desdemona and Emilia. While marriage is typically depicted as a source of joy, Shakespeare's use of marriage as an imprisonment for women and men in both A Midsummer Night's Dream and Othello displays the author's disillusionment of the practice.

# Cafeteria Catholicism: Picking and Choosing What Teachings Matter

**Katharine Gutkoski**

Faculty Mentor: Dr. Shannon Kelley

Meditz College of Arts & Sciences

Booth: 32

*This research was also presented at the National Women's Studies Association Annual Conference*

**Abstract:**
As a Catholic institution, Fairfield University follows Catholic doctrine. This is clear in the University's Student Handbook, where the contraception policy details that due to their commitment to "the dignity of the human person, we will not sell or offer any contraceptive devices or birth control." However, Fairfield University has a Gender Inclusive Housing Policy, despite the fact that Catholic doctrine teaches that gender is binary: man and woman. The Housing Policy at Fairfield reads "Fairfield University houses students consistent with their gender identity rather than perceived sex as required by applicable law. In alignment with the current housing practices, students will be able to live with the roommates of their choosing." My research examines the 28 other Jesuit colleges and universities and whether or not they do the same as Fairfield, both in their contraceptive and housing policies. Do all Jesuit universities pick and choose which Catholic doctrines they follow? If so, why is it that contraception is what defines how "Catholic" an institution is?

# “I can’t get over my disappointment in not being a boy”: Gender Dilemmas in Little Women

**Meghan Holt**

Faculty Mentor: Dr. Elizabeth Petrino

Meditz College of Arts & Sciences

Booth: 33

*This research was also presented at the National Collegiate Research Conference 2026 at Harvard University and the Richard Macksey National Undergraduate Humanities Research Symposium 2026 at Johns Hopkins University*

*This research was supported by the McGauley Family Fund*

**Abstract:**
Little Women concerns escaping the consequences of being born a woman in the nineteenth century - even through the total rejection of female nature in a phenomenon now recognized as transness. Elaine Showalter’s “Little Women: The American Female Myth” expresses popular scholarship’s appreciation of the novel for its portrayal of the dichotomy between female conformity and creative liberation. This understanding precedes my assertion that the March sisters are subject to a production paradigm in which children, particularly daughters, are raised with the expectation that they will one day leave the home and generate their own families, modeling the morality of their family of origin but nevertheless creating a new social and domestic unit through matrimony and reproduction. Perhaps unintentionally, Transcendentalist belief systems rejected institutionality while upholding and even strengthening domestic institutions. The institution of family, and theirs especially, is a godly “place” that demands to be reproduced. This expectation ignites a conflict when Jo, who routinely identifies with maleness and “boys’ manners”, rejects the advances of her friend Laurie, emphasizing her retreat from womanhood and the family-making processes that it represents. Examinations of Karin Quimby’s “The Story of Jo: Literary Tomboys, Little Women, and the Sexual-Textual Politics of Narrative Desire” and Alice Rutkowski’s “Louisa May Alcott’s ‘Enigmas’: Trans Feeling in the Nineteenth Century” informed my perspective that through experimenting with early understandings of trans identity and resisting as well as modeling paradigms of family production, Little Women by Louisa May Alcott works both in accordance with and against her Transcendentalist influences.

# Purifying pathology: examining cultural and medical implications of metaphors in the study of diseases

**Therafi Lin**

Faculty Mentor: Dr. Sonya Huber

Meditz College of Arts & Sciences

Booth: 34

*This research is affiliated with the Honors Program Thesis*

*This research was supported by the Humanities Institute Fellowship*

**Abstract:**
In "Illness as a Metaphor", Susan Sontag writes to her audience with fervor that the "most truthful way of regarding illness…is one most purified of metaphoric thinking". In other words, to grant patients the grace and dignity needed, the world must learn to purify the way we think of disease and the metaphors surrounding it. The question then, is to what extent can it be purified, if at all? This research project first explores the historical overview of diseases such as cancer and tuberculosis, drawing on their cultural and political implications. Then, it does a deep dive into Sontag's particular philosophy concerning the purifying behind the language of pathology. This exploration of Sontag inevitably culminates with the investigation of the philosophies that embody the medical and scientific disciplines, particularly in how scientists and healthcare providers view and utilize the usage of metaphors.

# Health Under Siege: The Systematic Breakdown of Healthcare in Gaza

**Natalie Eagle**

Faculty Mentor: Dr. Silvia Marsans-Sakly

Meditz College of Arts & Sciences

Booth: 35

**Abstract:**
This project critically examines the impact of Israeli military actions on healthcare infrastructure during the ongoing war in Gaza (2023-2025), highlighting systemic detrimental consequences for Palestinian health and well-being. By drawing on research into the social determinants of health, the study reveals how ongoing attacks on hospitals, clinics, schools, and places of worship undermine essential support for population wellness in several dimensions. By integrating historical context and recent evidence—including targeted strikes on IVF clinics and the restriction of food supplies—the project documents the cascading effects on this vulnerable community. Through a blend of visual and auditory media, this work not only presents the human cost of these assaults but also interrogates broader questions of intent, including allegations of ethnic cleansing and genocide.

# The Geopolitical Hierarchy and the Enforcement of International Law in Gaza

**Mia Van Mater**

Faculty Mentor: Dr. Silvia Marsans-Sakly

Meditz College of Arts & Sciences

Booth: 36

**Abstract:**
The ongoing humanitarian crisis in Gaza has left millions displaced, malnourished, and exposed to widespread violence. This devastation reveals a core contradiction of the international system in which humanitarian law presents as the universal authority, but its enforcement collapses when it confronts the interests of powerful states, specifically the U.S. The international community's failure to enforce humanitarian law in Gaza is not the result of legal ambiguity, but rather a structural U.S.-backed geopolitical hierarchy that transforms international law into a selectively enforced system. Through its use of power, the UN Security Council veto and, most recently, through Resolution 2803, the United States ensures that Israel remains shielded from accountability. Gaza exposes how power politics within the U.S.-dominant international order override legal norms, producing systematic impunity for Israeli violations and revealing a structural crisis at the core of the global legal order and international community. In the face of international paralysis, grassroots movements have emerged as alternative sources of accountability, challenging this imbalance and calling for consistent application of international law.

# Urban Transformation as Collective Healing in Colombia: Social Urbanism, Nature, and Memory in Medellín and Manizales

**Manuela Baranowski**

Faculty Mentor: Dr. Samuel Grimes

Meditz College of Arts & Sciences

Booth: 37

*This research was also presented at the Humanities Institute Student Fellow Presentations Event, Fairfield University*

*This research was supported by the Humanities Institute Fellowship*

**Abstract:**
This research examines Colombia's transformation after decades of violence by focusing on two cities, Medellín and Manizales, as examples of how urban spaces can support collective healing, memory, and renewal. While Colombia was long defined internationally by narcotrafficking, armed conflict, and instability, this paper argues that its recent transformation should be understood not only through physical development, but also through emotional, cultural, and environmental repair. Using ethnographic fieldwork, observation, and scholarly sources, I analyze Medellín's Comuna 13 as a case study to examine how processes of social urbanism are reflected in public infrastructure, murals, education, and memory practices that preserve the history of violence while promoting peace and belonging. I then compare this with Manizales, where transformation is expressed differently through ecological identity (nature), green spaces, wellness culture, and strong connections to the natural environment. By placing these cities in conversation, this project shows that Colombia's transformation is not one single story of modernization, but a place-based process shaped by memory, public space, nature, and everyday life. Ultimately, this research argues that urban transformation in Colombia is also a form of collective healing, one that helps rebuild not only cities themselves, but also identity, dignity, and hope after historical violence.

# Beyond the Shamrock: Irish Identity and Graphic Design

**Nolan Heffelfinger**

Faculty Mentor: Dr. Marice Rose

Meditz College of Arts & Sciences

Booth: 38

**Abstract:**
This capstone project blends my love of graphic design with my Irish heritage and interest in Irish culture and history. I spent this semester studying the evolution of graphic design in Ireland and its entanglement throughout the nation's cultural and political history. By tracing the development of Irish visual identity from Celtic times to the mid-twentieth century, and through the present day, I showcase how Irish graphic designers have shaped the way Ireland and "Irishness" are projected to the world. This was done through the analysis of key case studies such as Aer Lingus's branding strategy in the 1950/60s and the Kilkenny Design Workshops of the 1970/80s. My process involved examining historical design artifacts, academic literature and various marketing campaigns to trace how local and foreign design influences were intertwined at critical moments in Ireland's history. Alongside looking at historical examples, my research included looking at the modern-day use of the shamrock in international marketing. The shamrock has become the default visual symbol for Ireland around the globe, but it has no real ties to Ireland's history. To bring my research to life, I used my passion for graphic design to create a series of original designs inspired by various visual characteristics of different eras throughout Irish graphic design history. This allowed me to do something that I love while reflecting on the different aesthetics and cultural influences of each time period. My designs challenge the oversimplification of Irish identity in commercial contexts. After learning so much about Irish history, culture and design during my coursework as an Irish Studies minor here at Fairfield, I present in this project that there is so much more to Irish history and design than just the shamrock.

# Brahms and the Viola: A Study in Solo Expression

**Elizabeth Messier**

Faculty Mentor: Dr. Michael Ciavaglia

Meditz College of Arts & Sciences

Booth: 39

*This research is affiliated with the Honors Program Thesis*

*This research was supported by the Corrigan Scholars*

**Abstract:**
This lecture-recital included a research presentation and a full performance of the Brahms Sonata in F minor, Op. 120 No. 1 for viola and piano on March 28th, 2026, in collaboration with pianist Joanna Chang. This project discusses the composer Johannes Brahms, addressing the historical background of his life as context for the music he composed, namely the Sonata in F minor, Op. 120 No. 1 for viola and piano. Comparisons between the original clarinet version and the transcribed viola version are also presented, contributing to the argument that each version was composed specifically for its respective instrument, as opposed to just an original version and transcription. There is musical analysis included for each of the four individual movements, referencing specific musical examples throughout each section. Ideas presented in the musical analysis include markings specifically indicated by Brahms, as well as performance notes and observations from professional musicians, which act as suggestions that performers can adapt in their personal interpretations for performance.

# From Data to Narrative: How Storytelling Shapes Environmental and Climate Engagement

**Ella Toth-Melko**

Faculty Mentor: Dr. L. Kraig Steffen

Meditz College of Arts & Sciences

Booth: 40

*This research is affiliated with Sigma Xi, and Climate, Coastal and Marine Studies*

**Abstract:**
Climate change communication often struggles to bridge the gap between scientific knowledge and public understanding. While research has produced extensive data on environmental issues, this information alone does not always lead to meaningful engagement or action. My project explores how environmental storytelling can help address this disconnect by examining how traditional, data-driven communication can be more effective when paired with narratives. Drawing on interdisciplinary research, I analyze how storytelling engages audiences through emotional, cultural, and relational dimensions, as well as how narrative "transportation" and identification can influence attitudes and encourage pro-environmental behavior. I also examine storytelling in practice through environmental films and literature, focusing on how visual and written narratives shape audience perception and motivate concern for climate issues. To connect these ideas to real-world teaching and communication strategies, I incorporate insights from faculty interviews across disciplines, exploring how professors explain environmental issues to both specialists and non-specialists and which forms of storytelling they find most effective. Overall, this project argues that storytelling is a powerful tool for making environmental and climate issues more accessible and engaging, but that its effectiveness depends on how narratives are constructed and used. By identifying which forms of storytelling resonate most with audiences, this research highlights the potential of narrative as a key strategy for improving environmental communication.

# Dynein and nucleoporins work together to promote fertility in the nematode worm C. elegans

**Andrew Brino, Kelly DeBow, Lily Joyce, Therafi Lin**

Faculty Mentor: Dr. Anita Fernandez

Meditz College of Arts & Sciences

Booth: 41

*This research is affiliated with Sigma Xi*

**Abstract:**
We are interested in genetic interactions that affect reproductive fitness in C. elegans. Previous work showed that the combined disruption of dhc-1 (dynein-heavy-chain-1) and mel-28 (maternal-effect-lethal-1) results in a reduced brood size phenotype, suggesting a functional interaction between these genes. This relationship is surprising because dhc-1 encodes the large subunit of the minus-end directed microtubule motor dynein and mel-28 encodes a component of the nuclear pore. We used reciprocal crosses to determine that the reduced fecundity in these animals is due to defective oocytes and not defective sperm. Indeed, the oocytes in the double mutants are abnormally round and small. We then used a yolk reporter to track yolk import in developing oocytes. Yolk is produced in the intestine and subsequently imported into developing oocytes via receptor-mediated endocytosis prior to fertilization. We found that dhc-1; mel-28 double mutants fail to efficiently import a fluorescently-tagged yolk reporter (YP170::tdimer2). In normal animals the yolk receptor RME-2 is localized to the oocyte membrane then internalized upon binding by yolk before being rapidly recycled and placed back at the oocyte membrane. In the double mutants, the RME-2::GFP reporter is not efficiently delivered to the oocyte cell membrane and instead accumulates in the cytoplasm. These findings suggest that dhc-1; mel-28 double mutants have defects in the vesicle trafficking events needed for efficient recycling of the egg yolk receptor RME-2. We wanted to know if other nucleoporins also act in parallel with dynein to promote oocyte function. To test this, we generated dhc-1; npp-5 double mutants and dhc-1; npp-16 double mutants. We found that dhc-1; npp-16 double mutants had significantly smaller brood sizes compared to each single mutant, suggesting that indeed npp-16 and dhc-1 work together to support oocyte fertility. We did not observe this genetic interaction between dhc-1 and npp-5. Next, we will use fluorescent reporters to determine if dhc-1; npp-16 double mutants have failures of yolk import and yolk receptor recycling similar to those we observe in dhc-1; mel-28 double mutants.

# Characterizing Metabolic Features of ADSS1 Myopathy in Mice:  My Summer at the Beggs Lab

**Andrew Brino**

Faculty Mentor: Dr. Alan Beggs (Boston Children's Hospital)

Meditz College of Arts & Sciences

Booth: 42

*This research is affiliated with Sigma Xi*

*This research is supported by the Guillet Family Fund*.

**Abstract:**
Adss1 myopathy is an ultra rare congenital myopathy affecting less than 1 in 1,000,000 people across the world. Adenylosuccinate synthetase 1 (AdSS1) protein is required for the purine nucleotide cycle, forming fumarate for cellular respiration. AdSS1 is a muscle cell specific version of this enzyme, there exists a similar enzyme AdSS2 protein that is ubiquitously expressed in all cells. Mutation is the Adss1 gene in humans that can cause a wide pathogenesis including proximal and distal muscle weakness, muscle fatigue, hypotonia, respiratory insufficiency, dysphasia, and muscle atrophy. This new myopathy has little current research, and an animal model has not yet been fully established. Development of a murine model with a knockout version of Adss1 has been created but characterizing the model is next. RTqPCR confirmed the higher expression of Adss1 mRNA in muscle tissue compared to other tissues. In addition RTqPCR confirmed that the knockout model mice had little to no expression of Adss1 mRNA. An extracellular flux assay was performed on cultured fibroblast and myoblast cells to compare oxygen and glucose consumption across cell types. Results showed little difference between cell types, however on average knockout cell lines showed greater oxygen and glucose consumption compared to wild type. These findings suggest that knockout cell lines have higher metabolic rates than wild type cell lines regardless of fibroblast or myoblast cells. Future directions are to repeat the extracellular flux assay to confirm findings and further characterize the metabolic features by measuring other aspects of the purine nucleotide cycle.

# An RNAi screen for novel regulators of the microtubule motor dynein in the nematode worm Caenorhabditis elegans

**Kelly De Bow, Lily Joyce, Andrew Brino, Therafi Lin**

Faculty Mentor: Dr. Anita Fernandez

Meditz College of Arts & Sciences

Booth: 43

*This research is affiliated with Sigma Xi*

**Abstract:**
Proper cellular function requires the regulated transport of materials between different regions of the cell. Dynein is an important microtubule motor that ferries cargo toward the minus end along microtubule tracks. Regulation of dynein activity is essential to proper cellular function. We use the nematode worm Caenorhabditis elegans to study gene function and understand how genes interact to influence fertility. In previous work, we characterized a double mutant that serves as a useful tool to identify novel regulators of dynein. The main component of dynein is encoded by the dhc-1 (dynein heavy chain-1) gene in C. elegans. A temperature-sensitive mutation in this gene causes embryonic lethality at 26 °C but does not dramatically reduce brood size. However, the simultaneous disruption mel-28 in dhc-1 mutants causes a severely reduced brood size compared to the wild type. The mel-28 (maternal-effect-lethal-28), gene encodes a nuclear pore component required for embryonic development. mel-28 was not previously thought to be involved in fertility or dynein motor activity, highlighting how gene function can be context-dependent. To identify additional regulators of dynein function, we have conducted an unbiased RNA interference (RNAi) screen to identify treatments that affect fertility in dhc-1; mel-28 double mutants. RNAi allows gene disruption in live animals via introduction of a double-stranded RNA corresponding to a target gene. This treatment leads to the degradation of the target mRNA and disruption of gene function. There is a publicly-available RNAi library of bacterial clones expressing double-stranded RNA corresponding to each of the genes on Chromosome I in C. elegans. Using this resource, we screened thousands of clones in order to identify those genes whose disruption alters the fertility of dhc-1; mel-28 double mutants. After iterative rounds of screening, we identified RNAi treatments that increase or decrease brood size in the dhc-1; mel-28 double mutants. For example, RNAi disruption of kinesin regulator kca-1 (kinesin-cargo-adaptor-1) increases the brood size of dhc-1; mel-28 double mutants, partially rescuing the low-fecundity mutant phenotype. The KCA-1 protein is the egg yolk vesicle kinesin adaptor, and is needed to promote kinesin's transport of cargo toward the plus end of the microtubules. Our finding suggests that the low-brood-size phenotype we observe in dhc-1; mel-28 double mutants is due to excessive accumulation of materials toward the plus ends of the microtubules, and that this defect is partially rescued by disrupting the kinesin motor.

# Effect of Oleuropein and Punicic Acid on Oxidative Stress in MCF-7 Cells and Protective Role of Peroxiredoxins

**Samantha Diiorio**

Faculty Mentor: Dr. Shelley Phelan

Meditz College of Arts & Sciences

Booth: 44

*This research is affiliated with Sigma Xi*

*This research was also presented at the American Association for Cancer Research*

*This research was supported by the Science Institute, and the Hardiman Scholars Fund*

**Abstract:**
Many natural compounds have been shown to possess anticancer properties against breast cancer cells in vitro and/or in vivo, and there is increased interest in understanding the effects and mechanisms of action of such products as an alternative to traditional chemotherapy. Oleuropein is a polyphenolic compound derived from olive leaves that has demonstrated antioxidant and anticancer properties in breast cancer and other cancers. Punicic acid is a poly-5-unsaturated fatty acid found in pomegranate seeds that has also shown antioxidant and anticancer effects in various cancers. The MCF-7 cell line is an important model for estrogen receptor-positive (ER+) breast cancer which is useful for studying the effects and mechanisms of these natural products. We sought to compare oleuropein and punicic acid in this model and hypothesized that both would induce cytotoxicity in MCF-7 cells by increasing the oxidative stress and disrupting mitochondrial function. Cells were treated with 50 or 200 ug/ml oleuropein, 10 or 50 ug/ml punicic acid, or 70% ethanol as a control for 72 hours. Cytotoxicity was measured using an lactate dehydrogenase (LDH) release assay, and oxidative stress was assessed using the MitoSOX assay for mitochondrial ROS and malondialdehyde (MDA) quantification for lipid peroxidation. We found that oleuropein induced a significant increase in LDH release, and morphological changes consistent with apoptosis, but no significant increase in ROS. Punicic acid induced a dose-dependent increase in LDH release and additionally led to an increase in mitochondrial ROS and lipid peroxidation. Since we previously reported significant induction of expression of the Peroxiredoxin antioxidant genes by both oleuropein and punicic acid in these cells, we also set out to examine the effects of Prdx suppression on susceptibility to these compounds. Using transient siRNA transfections targeting each of the six Prdx genes, we found that suppression of Prdx2, Prdx3, Prdx4 and Prdx5 significantly increased MCF-7 susceptibility to punicic acid, but not to oleuropein. Together, our data suggest that these compounds induce cytotoxicity through different mechanisms, with oxidative stress playing a major role in punicic acid-induced toxicity. Targeting peroxiredoxins may be an effective strategy for increasing breast cancer cell susceptibility to these compounds in future therapeutic applications.

# Reuse or Refuse? Potential Plastic Degradation in Water Bottles Used by Fairfield University Undergraduates

**Brianna DiMaggio**

Faculty Mentor: Dr. Brian Walker

Meditz College of Arts & Sciences

Booth: 45

*This research is affiliated with Sigma Xi, and Climate, Coastal and Marine Studies*

*This research was supported by the McGauley Family Fund*

**Abstract:**
Bottled drinking water is a major microplastic (MP) exposure route for humans. It is estimated that those who use bottled water as their primary source of drinking water are ingesting substantially more MPs compared to those who drink tap water. Activities that induce mechanical stress - such as reuse and extended exposure to environmental sunlight - are shown to significantly increase MP release from plastic bottles into the water they contain. The purpose of this project is to examine how students use plastic water bottles and the extent to which reuse and mechanical stress can affect the rate of plastic degradation and the abundance of microplastics found in the water. It was hypothesized that more microplastics would be identified on filters from bottles that were reused more often and had a longer experimental period. Water bottles were distributed to participating undergraduate students to use (n=27), collected once a month for three months, filled with double-filtered water and filtered. Along with this, students filled out a weekly questionnaire regarding bottle use habits. Additionally, 30 control bottles remained in the lab filled with double-filtered water and were filtered at the same time as the experimental bottles. Resulting filters were analyzed and quantified for MPs using a dissecting microscope. Interestingly, initial analysis suggests that the color of water bottles (Red vs Blue vs Black) affected microplastic abundance. Further effects of intensity and duration of use on MP levels will also be discussed. By understanding the conditions that produce the most microplastics, humans can make healthier choices to avoid such high microplastic exposure, and manufacturers can take steps to reduce bottle breakdown and overall plastic usage.

# Bioacoustics for Conservation: A New Method for Monitoring Reproductive Cycles in Wild Cats

**Marlee Dubin, Thompson Marren, Isabella Manole, Olivia Taylor**

Faculty Mentor: Dr. Ashley Byun

Meditz College of Arts & Sciences

Booth: 46

*This research is affiliated with Sigma Xi, and the Center for Social Impact*

*This research was also presented at the Association of Zoos and Aquariums*

*This research was supported by the Science Institute, the Frederickson Family Innovation Lab Grant, the McGuinness Fund, the Mancini Family Fund, and the Lawrence Family Fund*

**Abstract:**
The majority of the 41 species of the cat family Felidae are threatened with extinction due to habitat loss and fragmentation. Despite coordinated breeding efforts through the Species Survival Plan (SSP), reproductive success among zoo-housed felids has declined over the past two decades. These declines are partly attributed to the difficulty of monitoring natural ovarian cycles and accurate estrus detection in real time. In 2023, we began monitoring long distance vocalizations in Amur leopards (Panthera pardus orientalis) to assess their feasibility in estrus detection.

From January 2023 to August 2024, we collected and annotated over 6,000 hours of audio recordings from Amur leopards at the Connecticut's Beardsley Zoo. Analysis revealed periods of increased vocal activity that align with the conception and birthing windows reported in the Association of Zoos and Aquariums (AZA) studbooks. We conclude that vocalizations are not only feasible but have the potential for detecting estrus both with high accuracy and in real time. Unfortunately, the challenge with using vocalizations to monitor reproductive cycles in any practical sense is the significant number of audio files and the time needed to analyze such large data sets. To overcome that difficulty, we are developing Felidetect, a bioacoustic tool that automates vocalization and thus estrus detection in felids. Ongoing work includes validating this method on additional Amur leopards and extending it to jaguars (Panthera onca) to assess broader applicability. This approach has the potential to enhance ex situ breeding success and support long-term conservation of endangered felids.

# Oleuropein Induces Oxidative Stress, Cytotoxicity, and Apoptosis in MDA-MB-231 Triple-negative Human Breast Cancer Cells

**Giovanna Kalin, Adam Vaz**

Faculty Mentor: Dr. Shelley Phelan

Meditz College of Arts & Sciences

Booth: 47

*This research is affiliated with Sigma Xi*

*This research was also presented at the American Association for Cancer Research*

*This research was supported by the Hardiman Scholars Fund*

**Abstract:**
Extra virgin olive oil, a foundational element of the Mediterranean cuisine, has been widely associated with numerous health benefits, including the prevention of degenerative diseases and the promotion of longevity. A major bioactive component of the olive tree is oleuropein, a phenolic compound predominantly found in olive leaves and fruit. Oleuropein has been well-characterized for its potent antioxidant and anti-inflammatory properties, as well as its potential anticancer effects demonstrated in both animal and cell-based models. In this study, we investigated the effects of oleuropein on the human triple-negative breast cancer cell line MDA-MB-231. Cells were treated with oleuropein at concentrations of 50, 200, and 400 µg/mL, or 70% ethanol control. We assessed cell viability using the MTT assay, cytotoxicity using the LDH assay, apoptosis using a Caspase 3/7 activity, and mitochondrial oxidation using Mitosox staining. We found the highest concentration of oleuropein to induce a significant decrease in viable cell density and a significant increase in apoptosis. We also examined the effect of oleuropein on the expression of the peroxiredoxin (Prdx) gene family, which encodes thiol-specific antioxidant proteins known to protect cells from oxidative damage and that we previously demonstrated to be induced by oleuropein in MCF-7 cells. We found significant induction of Prdx gene expression in MDA-MB-231 cells by oleuropein, with a marked induction of Prdx1 with the 400 ug/ml treatment. Current research is aimed at measuring Prdx protein expression in oleuropein-treated cells, as well as the effect of Prdx suppression on oleuropein susceptibility. Together, these findings suggest that oleuropein exerts dose-dependent anticancer effects in MDA-MB-231 cells that result in a robust peroxiredoxin antioxidant protein response. Further exploration of the mechanism of action of oleuropein in MDA-MB-231 cells will provide important insights into its pro-oxidant effects and potential therapeutic applications.

# Examining the Effects of Nanoplastic Exposure on Human Intestinal Caco-2 Cells

**Joseph Kanaan**

Faculty Mentor: Dr. Shelley Phelan, Dr. Walker

Meditz College of Arts & Sciences

Booth: 48

*This research is affiliated with Sigma Xi*

*This research was supported by the Science Institute, and the Biology Department*

**Abstract:**
Microplastics and nanoplastics have become ubiquitous in our environment, contaminating the food we eat and the water we drink. Primarily caused by plastic pollution and degradation, these small particles composed of synthetic polymers are carried by wind currents and have traveled to all parts of the earth. Nanoplastics are under 1000 nanometers in size and are typically composed of polyethylene, polystyrene, or polypropylene, which are all widely used in water bottles, clothing, and agri-food packaging. There is thorough documentation on the ingestion of these plastics and their presence in living organisms, including humans; however, there is a lack of data on the consequential cellular effects of plastic consumption. Our study aims to test the impacts of nanoplastic exposure on intestinal epithelial cells, specifically the Caco-2 cell line (human colorectal adenocarcinoma cells). This study has run over the course of 4 semesters, and during this time, we have developed a sound methodology for visualizing internalized plastics through the implementation of a dilute trypan solution. We have also developed methods to use LDH assays to measure cytotoxicity levels and MTS assays to measure viable cell density to assess if plastics are inhibiting cell growth. Our results showed high plastic uptake in the treatment group exposed to high concentrations of nanoplastics (150ug/mL). This treatment group also displayed significantly reduced cell viability and increased cytotoxicity, and these effects were amplified in the treatment groups without regular media replacement(chronic exposure). Moving forward, we want to explore how chronic plastic exposure impacts gene expression, potentially explaining the mechanism behind the results we have found.

# The plant-derived DYRK1A inhibitor harmine induces cytotoxic stress in MIN6 insulinoma cells

**Katarina Matosevic, Emme Haddad**

Faculty Mentor: Dr. Paul Riccio

Meditz College of Arts & Sciences

Booth: 49

*This research is affiliated with Sigma Xi*

*This research was supported by the Science Institute*

**Abstract:**
There has been intense focus on identifying novel therapies that boost the proliferation of insulin-producing beta cells, since restoring these pancreatic islet cells is the only cure for type 1 diabetes. The plant-derived DYRK1A inhibitor harmine has recently been found to induce proliferation of beta cells derived from rodent and human organ donorpancreata. We sought to determine whether harmine stimulates proliferation in the MIN6 insulinoma line, a mouse-derived beta cell model. Surprisingly, we found that harmine treatment reduces cell number and metabolically impairs MIN6 cells. To determine if this is due to DYRK1A inhibition or off target effects of harmine we have also treated MIN6 cells with the small molecule DYRK1A inhibitor GNF-4877. We are also investigating whether combination treatment with the GLP1-R agonist semaglutide (Ozempic) can protect MIN6 cells from harmine's cytotoxic effects. These findings are important for understanding how MIN6 cells as a beta cell model differ from primary human beta cells.

# Ambassador Animals Stressful Day at Work: Evaluating The Well-Being of Ambassador Animals at the Connecticut's Beardsley Zoo

**Katelyn May, Keira Hagerty, Marina Longo**

Faculty Mentor: Dr. Ashley Byun

Meditz College of Arts & Sciences

Booth: 50

*This research is affiliated with Sigma Xi, and the Center for Social Impact*

*This research was supported by the Lawrence Family Fund*

**Abstract:**
As zoos and aquariums have shifted from sources of entertainment to centers for conservation education, one of the most popular and powerful forms of educational programming is the use of ambassador animals. Ambassador animals provide visitors the opportunity to directly connect with wildlife, with numerous studies showing the effectiveness of these animals in promoting knowledge retention, empathy and a personal responsibility for conservation and the environment. While the educational benefit of these programs is clear, how these programs impact ambassador animals is not well understood. To evaluate their effect, we recorded behaviors and measured physiological responses related to stress in three ambassador animals: a barred owl, legless lizard and gopher tortoise at the Connecticut's Beardsley Zoo. These behaviors and physiological responses are compared prior, during and after mock ambassador programs. Results indicate that all three ambassadors experienced some stress as evidenced by an increase in body temperature and eye size in the barred owl, the occurrence of head bobbing and rapid limb movement in the gopher tortoise and an increase in panting and body stiffness in the legless lizard. Overall, our findings suggest that human interactions during programs do induce stress responses and that these responses varied depending upon the length of programming. Our work supports the importance of balancing animal welfare with educational programs.

# Mother-Offspring Recognition in Andean Bears

**Madison Raymond, Maryam Gharmal, Kiera Stevenson, Amelie Caruso**

Faculty Mentor: Dr. Ashley Byun

Meditz College of Arts & Sciences

Booth: 51

*This research is affiliated with Sigma Xi, and the Center for Social Impact*

**Abstract:**
The Andean Bear (Tremarctos ornatus) is a small arboreal bear native to the AndesMountain Range in South America. While adult Andean Bears are largely solitaryand typically leave their mothers within one to two years, observations of wildpopulations suggest that some adult females will continue to associate with theirmother and offspring despite many months of separation. This suggests that motherand offspring may be capable of recognizing one another long after the period ofparental care is over. Our project focused on possible kin recognition in amother and daughter Andean Bear recently reunited at the Connecticut'sBeardsley Zoo after a two-year separation. To investigate the possibility ofrecognition, we documented differences in behaviors between mother and daughterversus unrelated individuals. These behaviors included time spent near the adjoininghabitat areas, frequency, duration, and nature of interactions, as well as vocalizations using a combination of camera footage, audio recordings, and in-person observations from January to April of 2026. While data collection is ongoing, preliminary data of the above behaviors suggest recognition or familiarity at least on the part of the daughter towards her mother.

# Rocking, Moving, and Fighting: Seasonal changes in Eastern Hellbender (Cryptobranchus alleganiensis) behavior

**Kaitlyn Rousseau, Nathaniel Epstein, Dylan Leonard**

Faculty Mentor: Dr. Ashley Byun

Meditz College of Arts & Sciences

Booth: 52

*This research is affiliated with Sigma Xi, and the Center for Social Impact*

**Abstract:**
Eastern Hellbenders (Cryptobranchus alleganiensis alleganiensis) are the largest salamanders in North America. They are completely aquatic, living in clear, fast-moving rivers throughout the southeastern US. Eastern hellbenders are currently listed as endangered (IUCN) with their decline largely due to pollution, disease and overcollection. At Connecticut's Beardsley Zoo (CBZ), three hellbenders (two assumed males and one female) reside together in a single aquatic habitat. Despite coexisting together for more than several years, CBZ staff recently noticed an increase in physical aggression between them. Unfortunately, not much is known about hellbender behavior and the reasons behind the observed aggression were unclear. Systematic observations began in January 2025 to establish baseline behaviors, focusing on movement, behaviorand territorial spacing. During the summer of 2025, several behavioral changes were observed, including increased aggression (particularly between the two assumed males) as well as curious behaviors such as shifts in territory use, such as switching and sharing shelter sites. It was hypothesized that these behavioral changes may be associated with reproductive behavior, as tank water temperatures were increased during the summer to simulate outdoor weather conditions. During the summer, we also noted a reduction in rocking, a commonly observed but poorly understood behavior. While rocking is generally hypothesized to aid subcutaneous respiration, our observations do not support this, as rocking frequency did not correlate with oxygen levels. Based on recent observations of increased rocking following feeding, we suggest that rocking may be associated with digestion rather than respiration. Observations on rocking and aggression in the CBZ hellbenders are ongoing, with the ultimate goal of discovering new directions for understanding hellbender behavior.

# Brains, Bait, and Competition – Testing Cognition in North American River Otters

**Nina Sangiuliano, Nathan Crawford, Mia Barlanti**

Faculty Mentor: Dr. Ashley Byun

Meditz College of Arts & Sciences

Booth: 53

*This research is affiliated with Sigma Xi, the Center for Social Impact, and Climate, Coastal and Marine Studies*

*This research was supported by the Biology Department*

**Abstract:**
The North American River Otter (Lontra canadensis), is a semi-aquatic and highly intelligent mammal found in both Canada and in coastal waterways of the United States. Recent studies have indicated that river otters are capable of problem-solving, exhibiting both flexible thinking and sophisticated cognitive abilities. Between January and April 2026, we investigated the cognitive abilities of two female North American River Otters residing at Connecticut's Beardsley Zoo: Tahu and her daughter Flo. We examined the ability of Tahu and Flo to solve three different PVC puzzles baited with herring. Each puzzle was tested with Tahu and Flo alone, as well as Flo and Tahu together. Over multiple trials, we measured the success of solving the puzzle in both individual and cooperative attempts, also noting the time it took for one or both otters to succeed. Surprisingly, Flo did not solve any of the puzzles, though she was able to open the puzzle twice unintentionally during her solo trials. On the other hand, Tahu was able to intentionally open all three puzzle variations both alone and especially with Flo. During these trials, we observed that Tahu was best able to solve the puzzle when she was motivated by competition with Flo rather than motivated by food alone. This suggests that cognitive testing with solo trials may not fully capture the full cognitive abilities of river otters and that it may be important that future tests include competition-centered motivation to fully understand the cognitive abilities of North American River Otters.

# Investigating Cilia Regulation Using Hydra Vulgaris

**Luca Santin, Meryn McInnis**

Faculty Mentor: Dr. Scott Weatherbee

Meditz College of Arts & Sciences

Booth: 54

*This research is affiliated with Sigma Xi*

**Abstract:**
Cilia are essential organelles for motility, signaling, and tissue organization among eukaryotes, formed bymicrotubule outgrowth from basal bodies which are cylindrical microtubule structures arranged in aninefold symmetrical configuration (Carvalho-Santos et al., 2011). In the past two decades, dozens ofhuman diseases have been linked to defects in cilia formation or function. To better define how cilia areregulated, we chose to study cilia in Hydra vulgaris, a diploblastic cnidarian with distinct tissueorganization and established molecular tools. Cytoplasmic dyneins are microtubule-based motors thatdrive retrograde intraflagellar transport, a process essential for normal cilia morphology and function(Pazour et al., 1999). Ciliobrevins are small molecular inhibitors of cytoplasmic dyneins that disruptprotein trafficking within the primary cilium, resulting in notable defects and blockage of the Hedgehogsignaling pathway, which is tightly linked to cilia function (Firestone et al., 2012). Our project examineshow Ciliobrevin D affects ciliary morphology in Hydra. Brightfield and fluorescence microscopy wereused to document baseline ciliary organization and to visualize dose-dependent effects of dyneininhibition. After treating Hydra with previously-validated Ciliobrevin D concentrations (Firestone et al.,2012), we observed multiple defects including pronounced tentacle shrinkage after just one hour. Our preliminary experiments with lower concentration, longer duration application of Ciliobrevin D appear toshow alterations in cilia length. These findings support the use of Hydra as a model for analyzingconserved ciliary mechanisms. Future work will incorporate the use of transgenic Hydra and geneknockdowns using siRNA to test the roles of specific cilia-associated genes to define the geneticregulation of cilia in Hydra with potential applications to better understand human diseases.

# Turning Up the Heat: Temperature-Driven Changes in Black Sea Bass Escape Responses

**Matthew Shattuck, Sofia Carniglia, Hannah Snayd**

Faculty Mentor: Dr. Shannon Gerry

Meditz College of Arts & Sciences

Booth: 55

*This research is affiliated with Sigma Xi, and Climate, Coastal and Marine Studies*

*This research was also presented at the Society for Integrative and Comparative Biology, January 2027*

**Abstract:**
Climate change impacts the physiology and fitness of many ectothermic animals. Understanding thermal plasticity in skeletal muscle is crucial to predicting whole organism responses to changing temperatures. All fishes use a stereotyped C-start escape response, during which a fish rapidly bends its body into a “C” shape to generate thrust and escape in the opposite direction. Previous research has shown that colder temperatures slow escape responses. Black sea bass, Centropristis striata, is a temperate species found in the Western Atlantic Ocean spanning from the Gulf of Maine to the Gulf of Mexico. Three separate stocks are divided geographically: northern, southern and Gulf of Mexico. Fish from the Gulf stock are non-migratory and move into deeper water when temperatures drop. Our goal was to examine the effects of increasing temperature on Gulf black sea bass escape responses. We hypothesized that black sea bass escape responses will be faster at higher temperatures. We recorded the escape responses at 250 frames s-1 from 9 black sea bass that were acclimated to a variety of temperatures (20˚C, 24˚C, and 28˚C). We compared peak, minimum, and average center of mass (COM) velocities and accelerations among temperatures as well as peak, minimum, and average angular velocities and accelerations. We plan to repeat these experiments using black sea bass from the Northern stock as they are being forced to migrate poleward due to increasing temperatures.

# The Impacts of Increasing Temperature on Escape Response of Cunner

**Hannah Snayd**

Faculty Mentor: Dr. Shannon Gerry

Meditz College of Arts & Sciences

Booth: 56

*This research is affiliated with Sigma Xi, and Climate, Coastal and Marine Studies*

*This research was also presented at the Society for Integrative and Comparative Biology Annual Conference. Portland, Oregon January 2026*

*This research was supported by the Femia Science Endowment*

**Abstract:**
Cunner, Tautogolabrus adspersus, are a temperate species from the family Labridae that inhabit the Western Atlantic. This species experiences temperatures ranging from 0oC to 25oC in Long Island Sound. Once temperatures drop below 10□C, cunner find shelter and enter into extended torpor. We have previously shown that colder temperatures slowed the escape response. As temperatures are rising and cunner are starting to shift poleward, our goal was to examine the effects of warming temperatures. We hypothesized that cunner will exhibit a faster escape response at higher temperatures. We recorded the predator escape response at 250 frames s-1 from 4-6 cunner at each acclimation temperature (20□C, 22□C, 24□C, 26□C). We compared peak, minimum, and average center of mass (COM) velocities and accelerations among temperatures as well as peak, minimum and average angular velocities and accelerations. As predicted, velocity increased with increasing temperatures. Angular velocity decreased with increasing temperature, similar to our previous study. The increased speed at higher temperatures should make cunner less susceptible to predators and able to capture prey items. Thus, these behaviors may have implications at multiple trophic levels.

# Aggression as Assessment: Reproductive Monitoring by Male Black-Handed Spider Monkeys

**Jacqueline Sweeney, Nora Crowley, Brianna Cassese, Ian Brioso Torres**

Faculty Mentor: Dr. Ashley Byun

Meditz College of Arts & Sciences

Booth: 57

*This research is affiliated with Sigma Xi, and the Center for Social Impact*

*This research was also presented at the Association of Zoos and Aquariums*

*This research was supported by the McGuinness Fund, and the Lawrence Family Fund*

**Abstract:**
Female-directed male aggression in black handed spider monkeys has been observed in both wild and zoo populations. The exact nature of this aggression is not well understood though some possible explanations include attempts to dominate equally sized females, ritualized intimidation displays or attempts to assess sexual receptivity by triggering defecation/urination. At Connecticut's Beardsley Zoo, we examined the nature of this aggression of a single male monkey towards the females in his group. This aggression which included chasing, grabbing and apparent attempts at biting, caused some concern over the safety of target females. By observing the group's social dynamics and male to female interactions, we noted that aggression was often associated with place sniffs, assessments of female sexual receptivity, and defecation and/or urination by females. This led us to hypothesize that the primary source of female directed male aggression was the male's attempt to monitor female reproductive cycles and not poor relationship quality. On Dec 1, 2025, one of the older female monkeys who had not yet successfully reproduced received an implant of Deslorelin, a veterinary contraceptive. Following this treatment, we have not observed any aggression by the male towards this female despite the high frequency of aggression in the recent past. This supports our original hypothesis that the primary motivation of female directed male aggression in this group of black handed spider monkeys was to assess female sexual receptivity.

# Investigating the Effects of Punicic Acid on Signaling Pathways and Peroxiredoxin Expression in MCF-7 Cells

**Jenna Walsh, Katherine Tirino**

Faculty Mentor: Dr. Shelley Phelan

Meditz College of Arts & Sciences

Booth: 58

*This research is affiliated with Sigma Xi*

**Abstract:**
Punicic Acid (PA) is an omega-5 fatty acid found in the pomegranate fruit. Pomegranates have been found to provide several health benefits to humans including properties like anti-inflammation, anti-oxidation, and even anti-cancer. Fatty acids account for roughly 95% of oil content in the pomegranate fruit, and PA makes up roughly 70%-76% of the seed oils. Data suggests that PA may be an important factor which gives the pomegranate its health advantages. Previous studies in our lab have demonstrated that PA is cytotoxic to MCF-7 breast cancer cells at doses higher than normal dietary concentrations. To begin to understand the mechanism through which PA induces cytotoxicity in these cells, we used western blotting to examine multiple potential signal transduction pathways that may mediate its effect. We first confirmed the dose-dependent induction of cytotoxicity in MCF-7 cells using an MTT viable cell density assay as well as an LDH release assay for cytotoxicity for MCF-7 breast cancer cells treated with 0 µg/ml, 10 µg/ml, and 50 µg/ml of isolated PA for 96 hours. This data confirmed that treatment with 50 µg/ml led to a significant decrease in cell viability compared to the 0 µg/ml treated MCF-7 cells and that treatment with 10 µg/ml did not lead to a significant decrease in cell viability. We found significant cytotoxic activity at 50 ug/ml PA treated cells, but no significant activity was found in the 10 µg/ml treated cells. The induction of specific proteins in MCF-7 breast cancer cells treated with 0 µg/ml, 10 µg/ml, and 50 µg/ml of isolated PA for 96 hours and were analyzed through immunoblotting. Using immunoblotting, our data suggests that 96 hours of treatment with 50 ug/ml PA causes a slight reduction in the expression of Nrf2 and both 10 ug/ml and 50 ug/ml PA causes an induction of the PKC pathway, as shown by increased phosphorylation of phosphorylated PKC substrates. Our data is inconclusive on the effect on Phospho-JNK 1/2. We also examined the expression of all six Peroxiredoxin antioxidant proteins, and did not see any significant effect. Together, our data suggests that the PKC pathway is activated by PA in MCF-7 cells, and we will soon be examining the role it plays in mediating the cytotoxic effect in this cell line.

# Contamination Crisis: Investigating the Importance of Controls in Microplastics Research

**Andrew White**

Faculty Mentor: Dr. Brian Walker

Meditz College of Arts & Sciences

Booth: 59

*This research is affiliated with Sigma Xi*

*This research was also presented at the Society for Integrative and Comparative Biology Annual Conference. Portland, Oregon January 2026*

**Abstract:**
Microplastics (MPs), defined as plastic particles less than 5 mm in size, are widespread environmental contaminants found in air, water, soil, and biological systems. While research has extensively examined their distribution and ecological impacts, there is no standardized approach for analyzing MPs. A critical but often overlooked factor in microplastic research is contamination introduced during sample collection and processing, which can significantly influence results. This study aimed to evaluate sources of contamination and improve methodological reliability via the incorporation of control samples and spiking experiments. Samples representing potential contamination sources including air, water ($H_2O$), hydrogen peroxide ($H_2O_2$), and sodium chloride (NaCl) were analyzed for the number of potential microplastics present. When collecting air samples, varying levels of in-ceiling filtration were used to observe potential HVAC contamination. Vacuum filtration was used to isolate suspected MPs from both air and liquids, which were then identified using microscopy. To quantify recovery efficiency, spiking experiments were conducted by introducing known quantities of polyethylene beads into samples prior to processing. Bead recovery was tracked throughout filtration, and percent recovery was calculated by comparing initial and final bead counts. Microplastics were detected in all sample types, with NaCl exhibiting the highest average contamination levels at an average of 14 potential microplastics. Spiking results revealed that a substantial proportion of microplastics were lost during processing, with percent recoveries ranging from 0-70%. The presence of a clean in-ceiling filtration system greatly reduced contamination levels, with averages dropping from 7.5 to 3.25 potential microplastics. These findings emphasize the importance of accounting for contamination and methodological loss in microplastic studies. Incorporating controls and recovery experiments provides a more accurate framework for quantifying MPs and supports ongoing efforts toward standardizing analytical methods in this new and growing area of research.

# Identification of Metalloproteases in Various Snake Venoms

**Brady Wilson**

Faculty Mentor: Dr. James Biardi

Meditz College of Arts & Sciences

Booth: 60

*This research is affiliated with Sigma Xi*

**Abstract:**
Snake venom possesses a cocktail of various proteins that are intended to either debilitate and/or paralyze its target prey. Metalloproteases are a class of protein inside of the venom of particular snakes that function as digestive enzymes in order to assist in the consumption of their prey before they eat them. Metalloproteases are effective at degrading collagen, resulting in significant tissue damage and hemorrhaging. Some snakes, like rattlesnakes, possess large quantities of metalloproteases, while others, like the cape cobra, have little to no metalloprotease in their venom. Using protein gel electrophoresis and zymography, we were able to determine the size of proteins in various snake venoms that exhibit enzymatic activity. Performing gel electrophoresis with a PAGE gel and a reversible zinc stain allowed for the cutting, destaining, and digesting of the previously identified protein bands for use in MALDI-TOF mass spectroscopy analysis. We believe that the identification of these metalloproteases will allow for further understanding of snake venoms in a clinical setting, and potentially present positive uses for individual proteins found in venom.

# Not Just Seabirds, Songbirds Too: Terrestrial Microplastic Contamination in American Robins (Turdus migratorius)

**Catherine Wright**

Faculty Mentor: Dr. Brian Walker

Meditz College of Arts & Sciences

Booth: 61

*This research is affiliated with Sigma Xi, and Climate, Coastal and Marine Studies*

**Abstract:**
Most studies involving microplastics (MP) found in avian species have focused on aquatic birds. This emerging field of biology has neglected terrestrial species of birds, inadvertently avoiding the exploration of the sources of MPs in terrestrial environments. Studying MP contamination in aquatic animals involves simpler sampling and isolation protocols as lakes and oceans represent sinks for pollution. Exposure to MPs in terrestrial organisms has been under-explored as their environmental abundance can be less apparent compared to MPs in aquatic systems. This study involved looking at over 70 American Robin (Turdus migratorius) gut flushes to examine the number of MP fibers ingested. Gut contents are the easiest way to measure exposure of animals to MPs, as capture or sacrifice of animals is not necessary. The organic material of the gut flushes was digested and filtered using a vacuum filtration system, giving us a filter to examine under a dissecting scope. The fibers were then characterized by an AIM-9000 spectrophotometer. The number, color, general size, and the MP identities of each fiber were noted for each bird. Overall, each bird had on average 2.5 fibers in their gut flush sample. Across all birds, 117 out of a total of 177 microplastic fibers were black. The AIM-9000 identified most of the fibers to be polyoxymethylene and polycarbonate, where other prevalent identifications were PVC, nylon, polypropylene, and polystyrene. From these identities, we can determine the possible terrestrial sources of these microplastic fibers, and how robins and other omnivorous avian species ingest microplastics in their terrestrial environments.

# Progress towards the synthesis of the novel α,α-diethylglycine amino acids via nickel (II) complex containing a glycine equivalent

**Chinua Aghanwa, Sarah Breslow, Caroline Uniacke**

Faculty Mentor: Dr. Matthew A. Kubasik

Meditz College of Arts & Sciences

Booth: 62

*This research is affiliated with Sigma Xi*

*This research was supported by the Lawrence Family Fund*

**Abstract:**
Amino acids are organic compounds that serve as the fundamental building blocks of proteins, and are essential for growth and repair in the body. Noncanonical amino acids are becoming increasingly prevalent in drug discovery and pharmaceutical development. For example, the noncanonical amino acid Aib is used in the popular weight-loss drugs Wegovy and Ozempic. We present the progress towards the synthesis of the novel, noncanonical, amino acid α,α-diethylglycine via gly-nickel (II) complex. Sterically hindered α,α-dialkylated amino acids are important because they influence peptide three-dimensional structure, often promoting α-helices and 310-helices. New synthetic methods allow scientists to make specialized amino acids that help us understand proteins and their role in health. Our synthesized product was characterized via NMR Spectroscopy and purified with chromatography.

# Probing PEG Oligomers Using the STM-BJ

**Brandon Ally, Michael Considine, Gabrielle Airo, Isabella Devery**

Faculty Mentor: Dr. Boyuan Zhang

Meditz College of Arts & Sciences

Booth: 63

*This research is affiliated with Sigma Xi*

*This research was also presented at the Sigma Xi 2026 Northeastern Regional Research Conference*

**Abstract:**
The photophysical properties of Vitamin B12 derivatives are substantial factors that affects the molecules' ability to deliver drugs to target sites within the body. Prolonged release time, precise dosage dispensation, and the delivery of multiple agents are dependent on these photophysical properties. Previous research has found that the length of the side chain bonded to B12 determines its photophysical properties of B12. The B12 derivative that was measured consisted of a side chain polyethylene glycol (PEG) and glycine. These measurements utilize the scanning tunneling microscopic break junction (STM-BJ) to create a single-molecule junction, which divulges the conductance and length of that molecule. PEG oligomers in various concentrations provided by collaborators at the Aaron Van Dyke Lab were measured. These included the PEG monomer and dimer. The concentration of the PEG oligomers, the solvent used, and the applied bias were varied in order to determine the optimal conditions that would produce a clear conductance peak and molecular length. The solvents used included trichlorobenzene (TCB), propylene carbonate (PC), and tetradecane (TD). Additionally, the technique of coating the sides of the tip of the STM-BJ in wax was successfully used to reduce the Faradaic tunneling current caused by the dipole moment between the polar solvent PC and gold atoms on the sides of the tip.

# Peptide/Peptoid Conjugates for the Water Solubilization of Oligomers of α-aminoisobutyric acid

**Sarah Breslow, Colin Gorman, Chinua Aghanwa**

Faculty Mentor: Dr. Matthew A. Kubasik

Meditz College of Arts & Sciences

Booth: 64

*This research is affiliated with Sigma Xi*

*This research was also presented at the National Meeting of the American Chemical Society, Atlanta, Georgia*

*This research was supported by the Lawrence Family Fund*

**Abstract:**
Oligomers of the α-amino isobutyric acid residue, Aib, are known to form 310 helical structures in solution and the solid phase, at the length of about 6 residues. In principle, these helices could be used as scaffolds for catalytic groups or as components for peptide assemblies. Unfortunately, Aib-based oligomers are hydrophobic, so it is difficult to apply helical Aib-based scaffolds to aqueous systems. In this work we demonstrate the preparation of Aib-based peptide/peptoid conjugates. The peptoid components contain water-solubilizing ionizable groups. This poster focuses on synthetic methodology, combining SPPS with microwave assistance. We will present data characterizing our water-solubilized Aib oligomers, including FT-NMR, FT-IR, CD and MALDI-ToF data.

# Getting to Gold: What it Takes to Bridge the Gap

**Kiera Cunningham, Katelyn Kelly, Sebastian Lis, Kayleee Hennessey, Ean Ray, Christian Gioffre**

Faculty Mentor: Dr. Aaron Van Dyke

Meditz College of Arts & Sciences

Booth: 65

*This research is affiliated with Sigma Xi*

*This research was also presented at the American Chemical Society*

*This research was supported by the Lawrence Family Fund*

**Abstract:**
Peptides are everywhere, from social media marketing to therapeutic treatments. The length of a peptide is especially critical in determining its structure, stability and function in the body. Previously, peptide length has been measured using nanopores and AFM force spectroscopy. In this work, we utilize a scanning tunneling microscope break junction (STM-BJ) to measure peptide length, a method that is traditionally used to measure conductivity. To ensure compatibility with the gold tips of the STM-BJ, the peptide must be modified to include amine groups at both termini. The ideal conditions of the solvent and concentration of the peptide also play a critical role. We have explored the use of qNMR to determine the small concentration of our peptides that are used on the STM-BJ. The initial objective is to determine the exact molecular length of a triglycine peptide, PEG monomer, and PEG dimer. In the future, the effects of various solvents on peptide length will be investigated, along with measuring peptides of various composition and length.

# Preparation and characterization of five-coordinate cobalt (II) and nickel (II) ONO pincer complexes based on a bis-imidazole Precursor with a t-butyl wingtip group

**Lauren Hoffman, Caroline Uniacke, Isabella Bartilucci, Stephanie Tyros**

Faculty Mentor: Dr. John R. Miecznikowski, Olivier J.C. Nicaise, Brandon Q. Mercado, Sebastian Krajewski

Meditz College of Arts & Sciences

Booth: 66

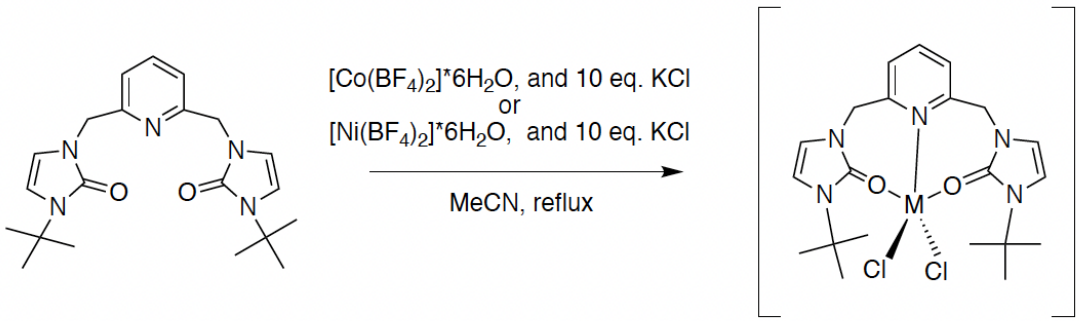
*This research is affiliated with Sigma Xi*

*This research was also presented at the Inorganic Chemistry Gordon Research Conference*

*This research was supported by the Science Institute, and the Department of Chemistry and Biochemistry*

**Abstract:**
We have developed and synthesized a tridentate pincer ligand precursor, which possesses two oxygen- and one nitrogen-donor functionalities (ONO), based on a bis-imidazole precursor. The tridentate ONO ligand, which is redox active, incorporates a carbonyl substituted imidazole functionality. We have prepared a flexible ligand system by employing the starting material 2,6-(dibromomethyl)pyridine to introduce a methylene linker into the pincer ligand precursor. Using the ligand precursor with R = t-butyl, we have metallated this ligand precursor to form cobalt(II) and nickel(II) complexes that contain this tridentate ligand. The cobalt(II) complex is blue and the nickel(II) complex is orange.

We formed five-coordinate metal complexes with pseudo trigonal-bipyramidal geometry. A detailed description of the preparation and characterization (NMR Spectroscopy) of the ligand precursor and of the metal complexes (X-ray crystallography, cyclic voltammetry, magnetic susceptibility, EPR Spectroscopy, UV-Visible Spectroscopy) will be presented.



# Synthesis and Analysis of Beta-Hairpin Peptides

**Tayana Jones, Michael Considine**

Faculty Mentor: Dr. Matthew A. Kubasik

Meditz College of Arts & Sciences

Booth: 67

*This research is affiliated with Sigma Xi*

**Abstract:**
We are examining the hydrophobic interactions of two twelve-membered beta-hairpin peptides through comparisons between the interactions of the amino acid at position 2 (X1 = Tryptophan (Trp)/Phenylalanine (Phe)) and position 9 (X2 = Lysine (Lys)/Norleucine (Nle)). It is hypothesized that because of the strong hydrophobic interactions that Lysine creates naturally between Trp-Lys and Phe-Lys to give proteins their stable, hydrophobic formation, that Norleucine would exhibit a similar nature as it is structurally similar to and hydrophobic like Lysine. Two peptide chains with X1 and X2 replaced with Trp/Phe and Lys/Nle respectively are synthesized and analyzed using MALDI-TOF and NMR to determine their folding fraction and bond strength. Going forward, we plan to continue to construct various hairpin peptides using non-canonical amino acids such as those with fluorinated functional groups in place of the aforementioned amino acids. Then, we plan to characterize the products and analyze their fold strength and ability using MALDI-TOF and NMR.

# Establishing the importance of Hoogsteen face hydrogen bonding capabilities in self-assembling nucleopeptides.

**Morgan Shirley, Tayana Jones, Krislley Soares Lacerda**

Faculty Mentor: Dr. Jillian Smith-Carpenter

Meditz College of Arts & Sciences

Booth: 68

*This research is affiliated with Sigma Xi*

*This research was supported by the Science Institute*

**Abstract:**
Short self-assembling peptides can be modified on the N-terminus with various purines to create nucleopeptides. These nucleopeptides combine the self-assembling properties of the short peptides and hydrogen bonding recognition along the Hoogsteen face of the nucleobase to form nanostructures with different higher-order architectures dependent on their sequence and C-terminus chemistry. The Smith-Carpenter lab has characterized higher ordered guanosine-based structures, such as G-quartets or G-ribbons, as secondary structures within supramolecular nucleopeptides using infrared spectroscopy, 1H-NMR, and circular dichroism spectroscopy. Data collected comparing guanosine, adenosine, and inosine containing nucleopeptides indicated that disruption of the Hoogsteen face hydrogen bonding negatively affected the nucleopeptides ability to self-assemble into stable nanostructure. To confirm the importance of the Hoogsteen face the lab has expanded the purine library with the addition of isoguanosine which has been shown to use the Hoogsteen face interactions in other self assembling systems. This semester the lab has focused on scaling up the synthesis of the isoguanosine precursor and creating an isotopically-enriched isog-GK[1-13C]FF nucleopeptide for further structural analysis.

# Designing a Four-Helix Nucleopeptide Bundle Capable of Hemin Binding

**Christie Stevkovski, Alexander Wong**

Faculty Mentor: Dr. Jillian Smith-Carpenter

Meditz College of Arts & Sciences

Booth: 69

*This research is affiliated with Sigma Xi*

*This research was supported by the Science Institute*

**Abstract:**
Driven by non-covalent interactions that include hydrogen bonding and hydrophobic forces, peptides can assemble into α-helical and β-sheet secondary structures. In the case of α-helices, each turn is based on seven amino acids, and the potential to bundle several helices together for the formation of higher-order structures is determined by peptide sequence. One common structural motif in protein design is the four-helix bundle, whose structure is critical to the function of many naturally occurring proteins. The Smith-Carpenter lab has previously synthesized a helical nucleopeptide (gs-helix), and preliminary data have shown that the guanosine contributes to higher-order helical interactions. Building on this, we sought to create a hemin-binding site by substituting histidine for alanine at position 8 of the 15-amino acid peptide (gs-helix_A8H). The synthesis of the gs-helix_A8H by SPPS, purification by HPLC, and characterization by MALDI and CD are reported.

# Characterization of the Secondary Structure and Stability of Self Assembling Peptides Including Tyrosine and Tryptophan

**Ben Tran, Alyssa Esposito**

Faculty Mentor: Dr. Amanda Harper-Leatherman, Jillian Smith-Carpenter

Meditz College of Arts & Sciences

Booth: 70

*This research is affiliated with Sigma Xi*

*This research was supported by the McGuinness Fund*

**Abstract:**
Self-assembled peptides are widely studied due to their applications in the biomedical field and due to the various interesting formations of nanoscopic and macroscopic structures. Many peptides have been studied to better understand how peptide length and order of amino acids can alter the chemical and physical properties of any formed self-assemblies. In this study, we looked to determine how amino acids containing aromatic rings affect self-assembled peptide structure and stability. We examined self-assembled peptides that include the aromatic residues, tryptophan (W) and tyrosine (Y). Specifically, we studied assemblies of the following peptides: KLVWYAE, KLVYWAE, and KLVWWAE. Self-assembly was confirmed and secondary structure of the peptides were determined through Transmission Electron Microscopy (TEM) and Fourier-Transform Infrared spectroscopy (FTIR). The stabilities of the assemblies were compared using thermal denaturation via circular dichroism (CD).

# Synthesis and Study of Noncanonical Peptides

**Katelyn Wiehe, Mason Macuch, Madison Koziol, Eleanor Feuster, Kacey McGorry**

Faculty Mentor: Dr. Elizabeth Stone

Meditz College of Arts & Sciences

Booth: 71

*This research is affiliated with Sigma Xi*

*This research was also presented at the The Symposium on Applied Synthesis and Gordon Research Conference on Stereochemistry*

*This research was supported by the Science Institute, the NASA Connecticut Space Grant Consortium, Faculty Grant, and the Mancini Family Fund*

**Abstract:**
Amino acids are the fundamental building blocks that form peptides and proteins to sustain and regulate life. While most peptides and proteins are made from twenty naturally occurring (canonical) amino acids, scientists can expand this chemical diversity by incorporating noncanonical amino acids, which are unnatural building blocks that introduce new properties and functions. Research in the Stone Lab focuses on designing and synthesizing these modified peptides to explore questions at the interface of organic chemistry and biochemistry. One major project of our group has been conducted in collaboration with the He Lab at Georgetown University in which we create biotinylated peptide-based inhibitors to study neuronal membrane proteasomes, which help regulate protein degradation in neurons. Our lab has a second collaborative project with the Pitre Lab at Oklahoma State University that focuses on synthesizing peptide substrates to support the development of new light-driven (photoredox) chemical reactions.Additional projects in the Stone Lab emphasize sustainability and new reaction development. One effort uses a cell-free protein synthesis system to incorporate noncanonical amino acids into peptides in vitro, enabling the study of protein function with expanded chemical capabilities. Another project involves developing a new Organic Chemistry II laboratory experiment using plant-based materials, such as beans, as natural catalysts to perform asymmetric reactions, introducing students to green chemistry and sustainable practices. Across all projects, undergraduate researchers gain hands-on experience in multi-step chemical synthesis, purification, and analysis while contributing to ongoing collaborations and the development of new scientific knowledge.

# Effectiveness of Bounding Regularity for Edge Ideals of Bipartite Graphs with Boolean Rank

**James Demers**

Faculty Mentor: Dr. Janet Striuli

Meditz College of Arts & Sciences

Booth: 72

*This research is affiliated with Sigma Xi*

**Abstract:**
The Castelnuovo-Mumford regularity is an invariant that measures the complexity of a set of polynomial equations, and one of the most used in algebraic geometry. Its computation remains fairly unknown. Thus, finding appropriate bounds for the regularity is an area of high importance. It is known that the induced matching number and the boolean rank (among other characteristics) provide a lower and upper bound, respectively, for the regularity of the edge ideal of a graph. For certain families of graphs, it is known that the Boolean rank provides a close approximation of the Castelnuovo-Mumford regularity. More generally, this project aims to understand whether the Boolean rank is indeed an effective bound.

# The Central Limit Theorem for Mathematical Billiards

**Nicole Reagan, Lucas Danburg, William Leland**

Faculty Mentor: Dr. Mark Demers

Meditz College of Arts & Sciences

Booth: 73

*This research is affiliated with Sigma Xi*

*This research was also presented at the Joint Mathematics Meetings 2026*

*This research was supported by the National Science Foundation Grant*

**Abstract:**
The Central Limit Theorem (CLT) is an important theorem in probability theory that holds for independent random variables, but it is also known to hold for some weakly-dependent variables. We investigate the theorem for particles dispersing ergodically on an irregularly-shaped billiard table. We use MATLAB to simulate many particles moving on the table and measure their trajectories over time. From our statistics, we show the convergence and its rate (or non-convergence) of the CLT as it depends on the shape of the billiard table. This research was conducted during the summer of 2025 and was sponsored by a grant from the National Science Foundation.

# Future Trends in Extreme Snowfall over Global Mountain Ranges

**Ethan Chow**

Faculty Mentor: Dr. Rob Nazarian

Meditz College of Arts & Sciences

Booth: 74

*This research is affiliated with Sigma Xi, and Climate, Coastal and Marine Studies*

*This research was also presented at the American Geophysical Union 2024 and 2025*

*This research was supported by the Science Institute, and the Lawrence Family Fund*

**Abstract:**
While extreme snowfall can have significant impacts on mountainous areas and nearby communities, such as hazardous road conditions, flooding, and changes to the snowpack, little work has been done to characterize these changes in a warming climate. In this work, we bridge the gap from climate to extreme weather through the investigation of these changes in extreme snowfall over global mountain regions. This is a particularly important question because, while theory and numerous previous studies indicate that extreme precipitation will increase in a warming climate, the warming could be sufficient to raise temperatures above the freezing point thereby decreasing the magnitude of extreme snowfall events. To conduct our analysis, we use the Coupled Model Intercomparison Project Phase 6 (CMIP6) ensemble, which has been previously used in a number of global extreme precipitation studies. First, we verify the estimates of extreme precipitation derived from simulations using several observational and reanalysis products. Preliminary comparison illustrates that the simulations reasonably capture both the magnitude and spatial distribution of extreme snowfall in observations. Given this agreement, we use the simulations to study future trends in extreme snowfall. Despite the projected increase in both mean extreme precipitation, we estimate a significant decrease in both mean and extreme snowfall over most mountain regions. We note, however, that there are increases in both mean and extreme snowfall over the northernmost mountain regions. To understand why the future trends in extreme snowfall exhibit this meridional gradient, we have conducted and will present a full analysis of the dynamics. How and why the magnitude of extreme snowfall will change over mountain ranges has a number of societal implications and is a crucial area of study in bridging the gap from climate to extreme weather.

# Quantitative light-matter interaction in the THz range for near-field microsopy

**Lucas Danburg**

Faculty Mentor: Dr. Adrian Gozar

Meditz College of Arts & Sciences

Booth: 75

*This research is affiliated with Sigma Xi*

**Abstract:**
Scanning Near-Field Optical Microscopy (SNOM) uses a sharp metallic antenna to scan the surface of a sample, providing information about its topography and electric properties. This is achieved by focusing light on the antenna tip, which scatters at varying intensity depending on the electromagnetic interaction between the tip and sample. This allows for deep sub-wavelength resolution, exceeding the limit of conventional microscopes. However, analytical models for tip-sample interaction in SNOM fail to reproduce experimental results. In particular, we wish to describe quantitatively the intensity measured when scanning a high-temperature superconductor, and better understand the relationship between antenna geometry and resolution/intensity. We aim to use COMSOL Multiphysics, a physical simulation software, to build a more realistic numerical model and replicate these results, gaining insight into the physical processes at hand and informing future experiments.

# Quantitative light-matter interaction in the THz range for near-field microsopy

**Lucas Danburg**

Faculty Mentor: Dr. Adrian Gozar

Meditz College of Arts & Sciences

Booth: 76

*This research is affiliated with Sigma Xi*

**Abstract:**
Scanning Near-Field Optical Microscopy (SNOM) uses a sharp metallic antenna to scan the surface of a sample, providing information about its topography and electric properties. This is achieved by focusing light on the antenna tip, which scatters at varying intensity depending on the electromagnetic interaction between the tip and sample. This allows for deep sub-wavelength resolution, exceeding the limit of conventional microscopes. However, analytical models for tip-sample interaction in SNOM fail to reproduce experimental results. In particular, we wish to describe quantitatively the intensity measured when scanning a high-temperature superconductor, and better understand the relationship between antenna geometry and resolution/intensity. We aim to use COMSOL Multiphysics, a physical simulation software, to build a more realistic numerical model and replicate these results, gaining insight into the physical processes at hand and informing future experiments.

# Light Propagation and Lasing in Chaotic Microcavities

**Ryan Denke**

Faculty Mentor: Dr. Adrian Gozar

Meditz College of Arts & Sciences

Booth: 77

*This research is affiliated with Sigma Xi*

**Abstract:**
Light, like dynamic billiards, is known to exhibit periodic or chaotic reflective patterns when it is contained within micron-scale structures. Unlike the billiards model where the trajectories remain confined to the structure as the ball reflects from the walls, light can escape by refraction. We show that geometric optics models based on ray tracing, which are expected to work when the cavity size is much larger than the wavelength of light, capture the directionality of the light emission, which is consistent with lasing. We also check how the ray-tracing models compare with exact full wave numerical simulations in the limits when the micro-cavity size is comparable to the wavelength. Analyzing light propagation and resonant modes in microstructures with deep sub-wavelength spatial resolution is challenging but within the capabilities of nano-optics. We plan to use our in-house simulation capabilities to design microcavities and to experimentally check the predictions of our results by near-field microscopy. This technique is based on atomic force microscopy where a laser illuminated sharp metallic tip is scanned across the microstructure. The spatial resolution is given by the tip apex size, which allows us to beat the diffraction limit by many orders of magnitude and obtain highly resolved images of lasing patterns, therefore surpassing the results obtained so far by far-field measurements.

# Mapping Historical Ocean Density and Stratification

**Nicholas Hasapidis**

Faculty Mentor: Dr. Rob Nazarian

Meditz College of Arts & Sciences

Booth: 78

*This research is affiliated with Sigma Xi, and Climate, Coastal and Marine Studies*

**Abstract:**
Understanding ocean stability is important for studying marine ecosystems and global ocean circulation. This project uses CMIP6 climate models to analyze ocean dynamics during the historical period from 1990 to 2009. By working with potential temperature and salinity datasets, ocean density and vertical stratification are calculated and graphed for different regions around the world. To better understand these marine environments, the research compares data from the ocean surface directly with near-bottom conditions. Mapping these physical variables shows clear baseline patterns of where stratification is strongest and weakest. Ultimately, this work provides helpful visual representations of historical ocean conditions, serving as a solid foundation for understanding future climate impacts.

# Demonstrating Earth’s Revolution Around the Sun via Stellar Parallax

**William Leland**

Faculty Mentor: Dr. David Winn

Meditz College of Arts & Sciences

Booth: 79

*This research is affiliated with Sigma Xi*

*This research was supported by the Science Institute*

**Abstract:**
Determining Earth's motion through space has been a central challenge in the history of astronomy, and the development of classical observational techniques allowed astronomers to measure Solar System distances and confirm the heliocentric model with high precision. This project replicates several of these measurements using a modern telescope setup, demonstrating that the tools of classical astronomy remain accessible and reproducible. An image of the nearby star Errai (γ Cephei) was taken on November 20th, 2025, with a second planned around four to five months later. They will be taken using a 14-inch Schmidt-Cassegrain telescope and a DSLR camera. Assuming background stars are effectively fixed, Earth's orbital eccentricity around the sun is negligible, and atmospheric effects are minimal, the star's apparent angular displacement in right ascension and declination will be measured via astrometric plate solving. The observed parallax angle will be used to geometrically relate Earth's orbital baseline to the distance to Errai. Supporting measurements, including the distances to the Moon, Sun, and Jupiter, the speed of light via the Rømer method, and the orbital eccentricity of Jupiter were obtained using classical triangulation and timing of the eclipse of Io. If the parallax measurement of Errai yields a distance consistent with its accepted value, the values will be plotted to directly prove Earth's orbital motion. Errors will be attributed primarily to pointing uncertainty, centroiding error, and atmospheric effects.

# Community Preferences for Sea Level Rise Mitigation and Adaptation at Connecticut Beaches

**Mattia Speretta**

Faculty Mentor: Dr. Rob Nazarian

Meditz College of Arts & Sciences

Booth: 80

*This research is affiliated with Sigma Xi, and Climate, Coastal and Marine Studies*

*This research was also presented at the American Geophysical Union 2025*

*This research was supported by the Lawrence Family Fund*

**Abstract:**
As sea level rise (SLR) accelerates, understanding public preferences for mitigation, adaptation, and risk management strategies is essential for effective policy design. This community-driven study integrates localized SLR projections with economic valuation techniques to assess household preferences for mitigating, adapting, and managing secondary impacts of SLR (increased flooding, beach erosion, water salinization, and ecosystem loss), along with perceptions of different program management approaches (municipal, governmental, and interinstitutional). We created a survey to understand these preferences to adapt, mitigate and manage the effects of SLR and paired it with an immersive augmented reality application for the Meta Quest headset, showing projected SLR from 2030 to 2100 in Fairfield, Connecticut. In the survey, participants indicated a "willingness to pay" (WTP) amount, representing the amount that the individual would want to invest in various SLR mitigation strategies and policy frameworks. Just over 50% of respondents indicated a willingness to contribute to a state fund for adaptation to SLR. We also found that individuals with lower WTP were more likely to support mitigation strategies and support this same state-level fund. Additionally, individuals living in the area for a longer period of time, are younger and/or are more educated are more likely to support mitigation strategies. Further work into the causality must be assessed. However, the findings from this community-based research highlight the need for understanding local preferences for adaptation and mitigation measures, by contributing to a deeper understanding of SLR with important implications for the community.

# Building the Magis -- The Political Development of Modern Jesuit Higher Education in America

**Caroline Cossman**

Faculty Mentor: Dr. Gwendoline Alphonso

Meditz College of Arts & Sciences

Booth: 81

*This research is affiliated with the Honors Program Thesis and Sigma Xi*

*This research was supported by the Corrigan Scholars*

**Abstract:**
Saint Ignatius of Loyola began the Society of Jesus due to a spiritual awakening that occurred during his recovery from battle in 1521, and in 1540 it was granted official recognition as a religious order by Pope Paul III (Rizzi 2022, 20-22). Initially, Loyola wanted to spread the Word of God that had been so transformative for him, and within a few years this goal was achieved primarily through educating. The Jesuits are the largest Catholic order in the world, and their societal mission is focused on teaching and saving the souls of the world (Jesuits, n.d.). The story of Jesuit education in America has been drawn out in the literature (Rizzi 2022; Gleason 2007; Currie 2010). Yet, there are three impulses that have shaped Jesuit education that have not been explicated. They are: evangelization, egalitarian education, and American belonging. These three mechanisms have played different roles in different eras of American history, and some have been more salient in certain times than others, but all three are the bedrock of the expansion of Jesuit institutions of higher education. This paper argues that the three animating impulses are motivating factors behind the development of Jesuit education from 1789 to the present day. I conduct a historical analysis of several Jesuit documents, Catholic Church decrees, Michael Rizzi's biography of Jesuit education, and Mark Nemec's work on secular colleges and universities to present the catalysts affecting Jesuit colleges and universities in the United States.

# Exploring the Relationship Between Children's Vocabulary, Mindset Beliefs, and Persistence in STEM

**Katelyn Bagley, Kayleigh Mezick, Eileen Russell, Andrea Doyle, Morgan Zickendrath, Grace Allen**

Faculty Mentor: Dr. Amanda Haber

Meditz College of Arts & Sciences

Booth: 82

*This research is affiliated with the Honors Program Thesis and Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference 2026*

**Abstract:**
Young children are often interested in engaging in STEM activities during the preschool years, but by the time they enter middle childhood, their sense of belonging and motivation to do science declines, especially for children who are from groups underrepresented in STEM careers (Lewe et al., 2019). Previous research has examined the relation between children's receptive vocabulary, mathematical knowledge, and their understanding of scientific content during the preschool and elementary school years (e.g., Lazaroff et al., 2022; Schmitt et al., 2019; Westerberg et al., 2022; Zucker et al., 2016). To the best of our knowledge, little work has explored the possible relation between children's vocabulary and persistence in STEM during the preschool years. Our study aims to focus on a sample of children from groups who are underrepresented in STEM and will examine the relation between receptive vocabulary in children and how it impacts children's (primarily children of color from low-SES backgrounds) mindset beliefs, as well as their engagement during a challenging scientific activity. Currently, we have collected data from N = 76 three- to five-year-old children (mage= 46.21 months, SD = 6.58, 44 female). In this study, children were first administered the Peabody Picture Vocabulary Test Version Four (PPVT-4). When conducting the PPVT-4, the experimenter read a vocabulary word to the child, and the child was asked to point to the picture that resembled the given word. A basal (set in which the child makes zero or one errors) and ceiling set (set in which the child makes eight or more errors) must be achieved when administering the PPVT-4 (Dunn & Dunn, 2007). When the ceiling set is met, the PPVT-4 is no longer administered. A raw score is calculated, which is then converted into a standardized score. Following the administration of the PPVT-4, the experimenter asked the child questions regarding their mindset beliefs, science interest and self-efficacy beliefs, and beliefs about effort and failure in STEM. The experimenter also presented the child with a STEM content measure that examines their rotational pattern recognition. Finally, children's persistence in STEM was then measured with a challenging science activity. A balance scale was presented to the children, and their persistence was timed and recorded. Data collection is still in progress, but preliminary findings for children's mindset beliefs suggest that children are more likely to endorse a growth (67.68%) rather than a fixed mindset (32.39%). For children's persistence during

a challenging science activity, the average persistence on the balance scale STEM task was 72.16 seconds (SD =45.31). Moreover, the average standardized PPVT-4 score was 91.22 (SD = 16.99). Currently, there is no significant correlation between children's PPVT-4 scores and persistence on a challenging STEM task. However, on average, children who endorsed a growth mindset seem to persist longer on the STEM task (M =74.38, SD = 48.10) than children who endorsed a fixed mindset (M = 69.83, SD = 41.77). Future work will explore children's interest and motivation in STEM, their beliefs about the relation between success and failure in science, and the relationship between STEM knowledge and receptive vocabulary.

# The Impact of Scientific Storybooks on Caregiver-Child Conversation, Mindset, and Failure Beliefs

**Kara Bode, Talar Markarian, Claire Colasuonno, Theresa Oshatz**

Faculty Mentor: Dr. Amanda Haber

Meditz College of Arts & Sciences

Booth: 83

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference 2026*

**Abstract:**
Caregiver-child interactions in STEM during early childhood are critical for shaping children's approaches to learning, motivation, and resilience when faced with difficult tasks. Previous research suggests that reading scientific storybooks that emphasized effort can encourage children (aged 4-5) to endorse more of a growth rather than a fixed mindset, and enhance motivation and persistence during challenging tasks for preschoolers and high schoolers (e.g., Haber et al., 2022; 2024; Haimovitz & Dweck, 2016; Lin-Siegler et al., 2016; Maloney et al., 2015). Yet, little research has focused on which specific types of caregiver language support or hinder children's engagement and learning during structured STEM activities. In the current study we aim to examine how caregiver-child conversation during scientific storybook reading impacts: Research Question 1: Children's (a) beliefs about caregiver expectations, perceptions about caregivers' beliefs about their abilities, and beliefs about demands from caregivers (b) perceived caregiver desire for children to keep trying (c) beliefs about their own intelligence and failure and d) children's interest in STEM? Research Question 2: Caregivers' (a) beliefs and perceptions about their children's ability and persistence (High Expectations for Academic Performance measure) (b) beliefs about intelligence and failure and (c) perceptions of child competence in school? Research Question 3: Caregiver-Child Interaction Dyadic Measures: (a) successful completion of the science task (building a circuit that turns the lightbulb on (b) persistence during the science activity and (c) caregiver-child language during the science activity Currently, N = 188 caregiver-child dyads (children aged 6-7; Mage= 81.02 months, SD = 7.31 months, 113 female, 45% = non-White families) have participated in the study via Zoom. In the study, caregiver-child dyads were randomly assigned to read a storybook about Mae Jemison and Lydia Villa-Komaroff, in one of three conditions: Achievement (n = 62, scientist received many awards with no mention of failure), Effort (n = 63, scientist faced many setbacks on her path to success), Baseline (n = 63, storybook did not highlight her achievements nor effort). After the storybook, dyads were introduced to the online science task. Dyads were told that shortly after responding to a few questions, they would work together to build a circuit to make the lightbulb turn on. Next, the experimenter asked children a series of a questions about their perceptions of their caregivers' expectations for their academic performance (adapted High Expectations for Academic

Performance (HEAP) measure; e.g., "My parents believe that I am going to figure out the science problem"), their perceptions of their caregivers' desire for them to keep trying (e.g., "It is important to my parents that I never give up on trying to solve a problem"), and their beliefs about their own intelligence and failure. Children answered questions using a six-point scale (not true, a tiny bit true, sort of true, almost true, true, and really true). The experimenter also asked children questions about their mindset beliefs (following Bempechat et al., 1991) and their interest in STEM. Caregivers were asked to complete the High Expectations for Academic Performance survey online (Hangen et al., 2024; "I believe that my child is going to figure out the science problem"). Next, caregiver-child dyads had five minutes to complete the science task together (build an online circuit that turns a lightbulb on). Finally, caregivers completed a second online survey assessing their beliefs about intelligence (Dweck, 1999), failure (Thrash & Elliot, 2003), child's competence in school (Haimovitz & Dweck, 2016), and fixedness (Muenks et al., 2015). Although data collection and analysis are still in progress, preliminary findings are organized by research question below:

**Research Question 1 (RQ1): Child-Level Results:** Findings for RQ1 part (a) indicate that the average score on the adapted HEAP measure (questions related to children's beliefs about caregiver expectations) was 36.25 (SD = 6.98), suggesting that children perceive their caregivers as having moderate expectations for their ability and performance. Findings for RQ1 part (b) demonstrate that the average score on the perceived caregiver desire for children to keep trying measure was 15.02 (SD = 3.28), indicating that children perceive their caregivers as strongly encouraging them to persistent on challenging tasks. Findings for RQ1 part (c) show that 83.51% of children endorse a growth rather than a fixed mindset. In line with prior research focusing on preschoolers (e.g., Haber et al., 2024), the highest number of children endorsing a growth mindset was observed in the Effort condition (87.3%), and the lowest in the Achievement condition (79.03%). Future analyses will explore how such child-level measures relate to caregiver-level measures.

**Research Question 2 (RQ2): Caregiver-Level Results:** Findings for RQ2 part (a) suggest that the average score on the HEAP measure was 35.29 (SD = 4.90), reflecting that caregivers generally report having moderate expectations for their children's ability and performance. Findings for RQ2 part (b) show that the average score on the failure measure was 21.76 (SD = 6.8), demonstrating considerable variability in caregivers' beliefs about failure. Although no significant differences in HEAP or failure scores were observed by storybook condition, future analyses will further explore how these measures relate to child-level outcomes.

**Research Question 3: Caregiver-Child Dyadic Interaction Results:** Results indicate that approximately 32.45% of families successfully completed the science task, and the average persistence on the science task was 254.10 seconds (SD = 77.42 seconds). Currently, we are transcribing caregiver-child language during the storybook reading and the science activity to understand how these interactions may predict child and caregiver beliefs about abilities, intelligence, and failure. Thus, we have developed a coding scheme which captures the following: directive language, autonomy supportive language, praise language (process versus person), and STEM language. The findings from this study may inform future interventions designed to promote children's interest in STEM and address gender disparities in STEM fields before the onset of formal schooling. These results also highlight the importance of early caregiver-child interactions

in shaping children's STEM beliefs. Storybooks may further support children's engagement with STEM activities and foster positive attitudes towards STEM.

# Analysis of Response-Locked EEG in Accurate, Forgotten, and Misinformation Memories

**Olivia Bonacci**

Faculty Mentor: Dr. Jessica Karanian

Meditz College of Arts & Sciences

Booth: 84

*This research is affiliated with Sigma Xi*

*This research was supported by the Science Institute and the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**
The current study uses electroencephalography (EEG) to examine how response-locked neural activity reflects the influence of misinformation on memory accuracy. Thirty-six participants were recruited to watch a 22-minute silent video depicting a non-violent crime and were subsequently exposed to misinformation through an audio retelling that included consistent, neutral, and misleading details about the event. Participants then completed a memory task while EEG was recorded. To examine these processes, response-locked event-related potentials (ERPs) were analyzed to compare brain activity associated with hits (correct memories), misses (forgotten information), and false alarms (memories for misinformation). Components linked to decision-making and memory retrieval, including the centro-parietal positivity (CPP; -300 to -70 ms) associated with evidence accumulation, and P3b (-200 to 200 ms), associated with attentional processing during recognition, were specifically examined. Results revealed significant differences in neural activity between hits, misses, and false alarms, indicating differences in response-locked neural processes during decision-making, particularly in the period leading up to a response. Together, these findings provide insight into how misinformation influences memory retrieval and decision-making processes that lead to accurate and inaccurate memory reports, with important implications for real-world contexts such as eyewitness testimony.

# Single, Stigmatized, and Searching: Motivations for Romantic Relationship Pursuit.

**Casey Cascio**

Faculty Mentor: Dr. Erin Hughes

Meditz College of Arts & Sciences

Booth: 85

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference 2026*

**Abstract:**
Both internal factors (e.g., beliefs about singlehood) and external influences (e.g., societal stigma) may explain why single individuals have worse well-being outcomes compared to partnered individuals. Across two studies, we examined whether singlehood stigma and social network composition predicted greater romantic relationship motivation. We hypothesized that stigma surrounding singlehood would be negatively associated with self-esteem and positively associated with extrinsic motivation to be in a relationship. Additionally, we examined whether having more coupled friends and attachment styles were associated with extrinsic motivation.Participants included single college students (Study 1: N = 87) and an older sample from Prolific (Study 2: N = 209) who completed our measures of interest. In Study 1 and Study 2, greater singlehood stigma predicted greater motivation to pursue a relationship. However, social network composition showed no effect in either sample. In Study 2, greater stigma was linked to lower self-esteem. In addition, avoidant attachment was associated with not wanting to be in a relationship, whereas anxious attachment was linked to greater internalization of stigma. These results suggest that singlehood stigma is a driving force for motivation to pursue a romantic relationship, and singles' perceptions of themselves.

# Navigating Change: The Effects of Self-Expansion Preferences on Well-Being and Self-Concept Clarity in College Students

**Katherine Dobbie**

Faculty Mentor: Dr. Erin Hughes

Meditz College of Arts & Sciences

Booth: 86

*This research is affiliated with Sigma Xi*

**Abstract:**
As students' transition to college, they face developmental shifts such as new social roles, uncertainty, and opportunities for growth. Self-expansion – the desire to seek novel or challenging experiences – may be especially relevant, yet its link to college well-being is not well understood. This longitudinal study examined whether first-year students' self-expansion preferences relate to self-concept clarity, well-being, and community engagement. First-year undergraduates (N = 115) completed measures at both intake and a follow-up survey two weeks later. Higher self-expansion predicted greater eudaimonic well-being and community engagement at intake but was unrelated to self-concept clarity or life satisfaction. Over time, self-expansion did not predict changes in well-being, however, self-concept clarity predicted greater eudaimonic well-being. These findings highlight the role of self-expanding experiences in fostering meaning and connection and furthermore stresses the importance of supporting students during this developmental transition period.

# Starting Psychedelic Drug Discrimination: Early Training and Expected Outcomes

**Eftyhia Fillas, Emily Alt, Cassidy Fusco, Kate Gerrish, Victoria Sgaglione**

Faculty Mentor: Dr. Karl Schmidt

Meditz College of Arts & Sciences

Booth: 87

*This research is affiliated with Sigma Xi*

*This research was also presented at the North East Undergraduate Research Organization for Neuroscience*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**
Psychedelic compounds are currently experiencing a resurgence of research due totheir potentially therapeutic effects across a range of psychiatric disorders. With thisresearch, remarkable findings distinguish the hallucinogenic effects from the therapeuticeffects and can only partially attribute these findings to serotonin 2a receptormechanisms. Rodents administered serotonin 2a receptor agonists engage in headtwitch responses, interpreted as hallucinogenic experiences. To determine whethertryptamine compounds that act as agonists at the serotonin 2a receptor but do notproduce head twitch produce similar interoceptive effects of psilocybin, we are using thedrug discrimination procedure. Male and female rats are being trained to discriminate 1mg/kg psilocybin from saline. Thus far, we can report that rats are able to discriminatethis dose of psilocybin. Next, we will determine dose effect curves when substitutingpsilocybin, LSD (hallucinogenic drug control), cocaine (non-hallucinogenic drug control),and three additional tryptamine compounds. Preliminary and expected results will bepresented.

# Proof vs. Potential: Sex Biases in the Evaluation of Job Applicants

**Gabriella Furnari, Brianna D'Ambrosio**

Faculty Mentor: Dr. Kathleen Tomlin

Meditz College of Arts & Sciences

Booth: 88

*This research is affiliated with Sigma Xi*

*This research was also presented at the 2026 Society for Industrial and Organizational Society Annual Conference*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship, and the McGauley Family Fund*

**Abstract:**
Building on existing evidence of sex-based biases in selection processes, we examine a new factor that may account for differential evaluations of male vs. female job candidates. Carefully controlled reference letters presented candidates as having either a track record of proven success or merely potential for success. Results validated our stimuli and scale items. Initial evidence that men are given relatively more “credit” for their potential, whereas women are rated highest when presented alongside concrete proof, have implications for both selection and evaluation processes.

# Catecholamine regulation of cocaine sensitization and restraint-stress cross sensitization in male and female rats.

**Kate Gerrish**

Faculty Mentor: Dr. Karl Schmidt

Meditz College of Arts & Sciences

Booth: 89

*This research is affiliated with Sigma Xi*

*This research was also presented at the Society for Neuroscience 2025 and Northeast Under/graduate Research Organization for Neuroscience 2026*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship and the Lawrence Family Fund*

**Abstract:**
Repeated administration of psychomotor stimulants, including cocaine, leads to stronger locomotor effects, a mechanism known as sensitization. In this experiment, male and female Long-Evans rats were subjected to one of three conditions throughout a 7-day period: daily injections of cocaine (10 mg/kg), exposure to 2 hours of restraint stress, or control conditions in home cage. To examine the contribution of noradrenergic pathways, some animals received pretreatment with clonidine, an alpha-2 adrenergic receptor agonist, while others received a vehicle solution. Following measurements of locomotor sensitization, brain samples were collected and processed using immunohistochemistry to evaluate c-fos activity in catecholamine-rich brain areas that are associated with stress responses and cocaine effects.

# Predictors of Psychotic-like Experience Distress: The Impact of Depression, Emotion Regulation, and Online Gambling

**Joseph Giacobbe**

Faculty Mentor: Dr. Joseph DeLuca

Meditz College of Arts & Sciences

Booth: 90

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference, 2026*

*This research was supported by the Science Institute and the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**

**Background:** Psychotic-like experiences (PLEs) are subthreshold symptoms of psychosis which can include symptoms that resemble those of schizophrenia, such as delusions or hallucinations. It is thought that PLE symptoms could be influenced by emotion regulation or other coping strategies. Results from previous research have found that difficulties in emotion regulation are associated with higher PLE frequency and higher PLE distress. Other potential risk factors for PLEs include contextual and clinical factors such as perceived stress and depression. One timely, though understudied, variable that may also be related to PLE risk is gambling. Research remains limited on the association between PLEs and gambling, and preliminary findings suggest that PLEs are associated with increased problematic gambling and increased impulsivity. Additionally, research suggests that higher emotion dysregulation may be associated with problematic gambling. The findings from this research highlight the importance of emotion regulation in managing the symptoms of PLEs, and suggest that gambling behavior could be associated with PLEs and emotion regulation, even while controlling for other known risk factors of PLEs. By understanding the relationship these three variables, we can identify potential intervention targets to help people overcome PLE symptoms and problematic gambling.

**Method:** Our final sample consisted of 916 participants. Regarding gender, our sample was 50% women, 49% men, and 1% nonbinary. Participants were in their mid-twenties on average ($M^{age}$ = 27.2, *SD* = 4.8). Most participants identified as White (63%) or Black/African-American (14%); 16% identified as Hispanic/Latino/a/x. All participants lived in the United States. We used several reliable and valid measures, including the Difficulties in Emotion Regulation Scale (DERS-8) to measure emotion regulation difficulties, the Prodromal Questionnaire – Brief Version (PQ-B) to measure PLEs, the Perceived Stress Scale (PSS-4) to measure perceived stress, and the Patient Health Questionnaire (PHQ-9) to measure depression. Online gambling was measured via one question about betting in the last 30 days.

**Results:** We found a large positive correlation between PLE frequency and emotion dysregulation, $r = .45$, $p < .001$, $N = 913$. We also found a large positive correlation between PLE distress and emotion dysregulation, $r = .49$, $p < .001$, $N = 914$. We also conducted multivariate analyses to analyze the associations between PLE distress and emotion regulation, perceived stress, depression, and online gambling. The overall model was statistically significant, $F(4, 441) = 58.03$, $p < .001$, $R^2 = .35$. Emotion dysregulation (standardized beta = .25, $p < .001$), depression (standardized beta = .35, $p < .001$), and online gambling (standardized beta = .11, $p = .005$) were found to be significantly associated with PLE distress when the other variables were controlled for.

**Discussion:** The purpose of this study was to analyze factors that could potentially be associated with PLE distress, such as emotion regulation, depression, and gambling. As hypothesized, online gambling behavior predicted unique variance in PLE distress, even after controlling for emotion regulation, perceived stress, and depression. The findings from this study are consistent with previous literature which found associations between emotion dysregulation and various symptoms of psychosis or PLEs. Additionally, the findings are consistent with previous literature which found associations between PLEs and gambling. The present study is the first to incorporate PLE distress, emotion regulation, and gambling behavior into one model. One strength of this study is a large sample size, which increases the generalizability of the results. However, this study was limited in that the data relied on self-report measures, which could be subject to bias. Additionally, this study was cross-sectional where we only collected responses from one point in time. Future research could incorporate a longitudinal design which measures how changes in PLE symptoms could be associated with changes in emotion regulation strategies or gambling behavior over time. Overall, the findings from this study highlight the influence of emotion regulation strategies in either exacerbating or mitigating PLE frequency and distress.

# Does Empathizing with the Positive Emotions of Others Who are Struggling Yet Hopeful Reduce Physiological Precursors of Burnout?

**Angelina Gonzalez**

Faculty Mentor: Dr. Michael Andreychik

Meditz College of Arts & Sciences

Booth: 91

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference, 2026*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**
Burnout is a form of prolonged stress linked to mental, emotional, and physical exhaustion, as well as being detached and ineffective at one's job. Given these negative consequences of burnout, it is important to understand its causes and correlates. Expanding on existing correlational research showing that whereas those who tend to empathize strongly with others' negative emotions (e.g., anxiety, pain, sadness) report increased symptoms of burnout, those who tend to empathize strongly with others' positive emotions (e.g., relief, hopefulness) report fewer symptoms of burnout, I conducted an experimental study examining the potential causal effects of empathic perspective on burnout. 293 participants watched emotional videos where people discussed the physical and/or mental health issues they were facing. Before watching the videos, participants were randomly assigned to either empathize with the negative emotions displayed in the videos, the positive emotions displayed in the videos, both the negative and positive emotions, or to remain objective and detached while watching. Results showed that individuals instructed to focus on negative emotions reported the highest levels of burnout after watching the videos and also showed evidence of cognitive exhaustion on a Stroop task. In contrast, participants instructed to focus on positive emotions reported the lowest levels of burnout and showed no performance decline on the Stroop task. These results provide experimental evidence that whereas focusing on others' negative emotions leads to higher levels of burnout, focusing on their positive emotions can protect against burnout.

# A Change of Heart?: Testing the Effect of an Empathy Intervention on Implicit Racial Bias

**Chloe Hand, Lea Theophilos, Katie Ourfalian**

Faculty Mentor: Dr. Michael Andreychik

Meditz College of Arts & Sciences

Booth: 92

*This research is affiliated with Sigma Xi*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**
Despite the fact that the past 30 years have seen a decline in self-reported racial bias towards African Americans, it is evident that discrimination is still persistent in today's society. This may be due to implicit bias. Previous research has focused on using empathy interventions to reduce implicit bias; however, this work has failed to provide evidence that empathy reliably reduces implicit bias. We think this may be because past work focused exclusively on asking people to empathize with the suffering and other negative emotions of African Americans, thus inadvertently strengthening associations between Black individuals and negativity and leaving implicit bias intact (or even strengthening it). To address this potential issue in prior work, our study employed both positive and negative empathy conditions to evaluate whether (certain types of)empathy can reduce implicit bias. A sample of 310 white American adults was randomly assigned to empathize with African Americans displaying positive, negative, or mixed emotions before completing a race Implicit Association Test (IAT). There was also a control condition that only included the race IAT with no empathy task. Our results were not statistically significant, but they did suggest a pattern of reduced implicit bias when participants focused on empathizing with a single emotion rather than in a mixed-emotion condition. In the future, researchers could use a stronger empathy manipulation that focuses on either positive or negative emotions, rather than both.

# Psychotic-Like Experiences, ADHD Symptoms, and Prospective Help-Seeking in the General Population

**Jack Kenny**

Faculty Mentor: Dr. Joseph DeLuca

Meditz College of Arts & Sciences

Booth: 93

*This research is affiliated with Sigma Xi*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship and the Lawrence Family Fund*

**Abstract:**

**Background:** Psychotic-like experiences (PLEs) are more common than people think, with a lifetime prevalence rate of approximately 8% in the general public. Although PLEs exist below the threshold of clinical psychosis, they are not benign. These experiences can coincide with emotional distress, functional impairment and, for a meaningful minority, serve as an early marker of eventual transition to psychotic disorders if ignored or untreated. Mental healthcare utilization is strongly tied to improved prognosis in individuals experiencing distressing PLEs or otherwise in the early stages of psychosis. However, people who experience PLEs do not consistently access or receive mental health services, even when they report significant distress. One promising and understudied factor that may influence both PLEs and service utilization is ADHD. However, no studies to date have examined mental health care utilization among individuals with co-occurring elevated PLEs and ADHD symptoms.

**Method:** Our total sample size was $N = 916$. Our sample was 50% women, 49% men, and 1% nonbinary. On average, our participants were in their mid-twenties ($M^{age} = 27.2$, $SD = 4.8$), and most participants identified as White (63%) or Black/African-American (14%); and 16% identified as Hispanic/Latino/a/x. All participants lived in the United States. To assess participants' individual risk of developing psychosis through PLE symptoms, we used The Prodromal Questionnaire-Brief (PQ-B). ADHD symptoms were measured using the Adult ADHD Self-Report Scale (ASRS-6), a 6-item brief screening tool measuring probable ADHD symptoms. Last, prospective help-seeking intentions were measured using one item. We hypothesized that (1) higher ADHD symptoms would be be positively associated with PLE symptoms and (2) individuals with elevated ADHD and PLE symptoms would report greater likelihood of mental health care utilization compared to those with lower symptom levels.

**Results:** Consistent with hypothesis 1, ADHD symptoms and PLEs were positively correlated (PLE total: $r = .44$ , $p < .001$; PLE distress: $r = .41$ , $p < .001$). Consistent with hypothesis 2, both ADHD symptoms and PLEs were positively correlated with prospective help-seeking (ADHD symptoms: $r = .34$ , $p < .001$; PLE total: $r = .25$ , $p < .001$; PLE distress: $r = .31$ , $p < .001$). To better understand

hypothesis 2, we conducted a multiple regression analysis; in this model, $F(3, 908) = 53.68$, $p < .001$, both ADHD symptoms and PLE distress (but not PLE total score) were significant predictors of prospective help-seeking. There was no evidence of ADHD symptoms moderating the relation between PLEs (distress and total) and prospective help-seeking.

**Discussion:** In the present study, both ADHD symptoms and PLEs (distress) independently predicted higher intentions to seek mental health treatment, supporting prior work showing that psychological distress and ADHD-related symptoms can increase help-seeking motivation. However, ADHD symptoms did not moderate the relationship between either PLE total or PLE distress and help-seeking, suggesting that ADHD does not amplify or diminish the help-seeking influence of PLEs. Future studies could evaluate the underlying cognitive impairments associated with ADHD, such as working memory and processing speed, which may be more precise predictors of bridging prospective treatment to behavior than ADHD symptoms. Actual help-seeking v. potential help-seeking can also be measured in the future, which would elucidate potential barriers to care.

# Adolescent Social Isolation and Resveratrol Treatment: Examining Effects on Behavior in Female Long Evans Rats

**Marikate Kenny, William Totz, Sofia Venanzi, Sean Huvane**

Faculty Mentor: Dr. Shannon Harding

Meditz College of Arts & Sciences

Booth: 94

*This research is affiliated with Sigma Xi*

*This research was also presented at the Northeast Under/graduate Research Organization for Neuroscience (NEURON)*

*This research was supported by the Science Institute and the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**
Adolescence is a critical period of development when social experiences can significantly influence brain and behavior. During this time, social isolation (SI) has been linked to increased anxiety-like behavior and impaired cognitive function. Resveratrol (RSV) is a naturally occurring polyphenol found in the skin of red grapes that has antioxidant and neuroprotective properties. Previously, our lab reported that SI in adolescent male rats increased anxiety and delayed spatial learning, and that RSV treatment improved spatial retention. To examine sex differences in behavior, the present study replicated the previous experimental design in female rats. On postnatal day 28, 18 females were assigned to one of three groups: group-housed (3 rats per cage), SI (1 rat per cage), or SI + RSV (50mg/L administered in water bottles). Behavioral tests began five weeks later and included Elevated Plus Maze (EPM) and Marble Burying (MB) to assess anxiety-like behavior, and Morris Water Maze (MWM) to measure spatial learning and memory. Preliminary data analysis suggests no differences between groups, contrary to our predictions. We will report findings from MWM, as tests are currently being conducted. Follow-up studies will include comparing male and female behaviors, plus measurements of stress hormones and markers of GABA-ergic activity in brain areas associated with anxiety and spatial memory. This study could have important implications for understanding the long-term impact of social isolation on adolescent boys and girls.

# The Intersection of Stigma, Psychotic-Like Experiences, and other Clinical Factors on Prospective Help-Seeking

**Emily Lamoureux**

Faculty Mentor: Dr. Joseph DeLuca

Meditz College of Arts & Sciences

Booth: 95

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference, 2026*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**

**Background:** Despite the relatively common occurrence of psychotic-like experiences (the lifetime risk of developing a PLE is around 7.8%), many people experiencing them do not receive psychological support. Stigma has been found to be a main barrier to seeking psychological help and a risk factor for negative clinical outcomes. Additional factors like perceived stress and depression have also been found to impact prospective help-seeking. To date, few studies have focused on the intersection of self-stigma, PLEs, and other clinical factors in regard to help-seeking. Our study aims to advance current research on self-stigma and PLEs, specifically evaluating how stigma might influence help-seeking attitudes among individuals with PLEs.

**Method:** Participants from the United States (N=916) were recruited online using census-matched sampling (CloudResearch). The sample was majority white (63%) and most were in their mid-twenties (M=27.2, SD= 4.8) and had completed some type of college-level education (35%). For our study, participants completed a 10-minute online survey. To assess PLEs, participants completed the Prodromal Questionnaire-Brief (PQ-B). The PQ-B is a 21-item questionnaire that asks participants to self-report. To assess participants' feelings of personal (self-) stigma towards seeking help, we used the Self-Stigma of Seeking Help (SSOSH) scale. We used the three-item version of the SSOSH, and it also required participants to self-report. Additionally, we assessed participants' symptoms of depression and used the patient-health questionnaire (PHQ-9). After completing these scales, participants were debriefed at the end. We hypothesized that higher ratings of self-stigma would be significantly correlated with higher PLEs in a U.S. sample. We also hypothesized that after controlling for additional variables in a regression model, self-stigma of seeking help would still be the strongest factor.

**Results:** After running bivariate correlations, we found a significant positive association between PLE symptoms and self-stigma of help-seeking, $r$=.16, $p$<.001, $N$=912. For an exploratory analysis, we found that PQ-B items 5, $r$=.19, $p$<.001, $N$=913, 8, $r$=.15, $p$<.001, $N$=913, and 5, $r$=.14, $p$<.001, $N$=913 had the highest correlations. To evaluate the relative contribution of several variables, we

ran a multivariate analysis with predictors of perceived stress, PQB total/frequency, and depression (dependent variable: prospective help-seeking). We found that all variables except for perceived stress contributed significantly to the prospective help-seeking model, with self-stigma having the largest effect (standardized beta = -.35, $p < .001$), followed by depression (standardized beta = .33, $p < .001$) and PLEs (standardized beta = .10, $p = .004$). These findings suggest that even after controlling for additional variables, self-stigma is still a significant barrier to help-seeking.

**Discussion:** Consistent with past research, participants in our study who reported higher levels of self-stigma reported more PLEs. For our exploratory analysis, it is possible that these items all had the highest levels of stigma because they included the perception of others. With that, we can infer that people do not like being looked down on by others for something they cannot control, also consistent with past work. Even when we adjusted for other variables, self-stigma was still the strongest effect. This suggests that self-stigma plays a significant barrier to help-seeking, even when controlling for stress, depression and PLE symptoms. Future studies could examine other moderator variables, like age or race, and see if that has an impact on PLE symptoms and prospective mental health help-seeking.

# In what sense are people aware of their implicit attitudes? Using time pressure to investigate the mechanisms underlying predictive accuracy

**Julia Ludovico, Andrea Doyle, Olivia Colson, Juliana Fiumidinisi**

Faculty Mentor: Dr. Michael Andreychik

Meditz College of Arts & Sciences

Booth: 96

*This research is affiliated with Sigma Xi*

**Abstract:**
Implicit attitudes are typically defined as one's initial gut reaction to a stimulus. Psychologists have historically assumed that people lack conscious awareness of their implicit attitudes. However, people are surprisingly accurate in predicting their performance on various measures of implicit evaluation (Hahn et al., 2014; Andreychik & Fuchs, 2025). The purpose of the present study was to determine where this predictive accuracy comes from. Are people able to accurately predict their performance on implicit measures because they have direct access to their own implicit attitudes, or does predictive accuracy instead come from more constructive processes (e.g., educated guesses about what kinds of implicit attitudes one is likely to hold). To examine this, we asked Fairfield University students (n=56) to predict their performance on measures assessing their implicit associations with five different categories. Half of the participants made their predictions under a time constraint (1000ms), while the other half had an unlimited time. Then, all participants completed measures of their actual implicit associations with the five categories. We then looked at the relationship between the predicted and actual scores in each of the two prediction conditions. Results showed a significant relationship between predicted and actual implicit attitude scores for all participants, regardless of timing condition. The ability of those in the time-constrained condition to achieve the same predictive accuracy as those with unlimited time suggests that more thoughtful, constructive processes are not necessary for predictive accuracy, suggesting that people's ability to accurately predict their own performance on measures of implicit associations may indeed come from direct introspective access to their own implicit attitudes.

# The Intersection of Early Menarche, Psychotic-Like Experiences, and Other Clinical Factors

**Madison Oberly**

Faculty Mentor: Dr. Joseph DeLuca

Meditz College of Arts & Sciences

Booth: 97

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference, 2026*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**

**Background:** Psychotic-like experiences (PLEs) remain under-recognized by clinicians and researchers, and are also stigmatized throughout the population. Understanding the various factors that contribute to PLEs can inform clinical decisions, both psychologically and regarding a female's overall health, specifically early menarche. For girls, the start of puberty is marked by menarche, their first menstruation, and the timing plays a significant role in their development both physically and mentally. Additionally, early puberty can be associated with several different negative mental health outcomes, including depression and anxiety. Previous research has looked at developmental factors and hormones in females and their relation to overall health, including the related risk and association with anxiety and depression symptoms, PLEs, and previous childhood traumas. The impact of these developmental psychopathologies may potentially create a causal relationship to their increased risk of several negative mental health outcomes, including depression and anxiety. Currently, there is no specific research that correlates early menarche, PLEs, and various clinical factors, creating an especially important area to focus on in adolescent and young adult mental health. The purpose of this study is to analyze the intersection between women's health, more specifically, early menarche, psychotic-like experiences, and several other clinical factors.

**Method:** Participants completed a 10-12-minute survey that was conducted via CloudResearch, with participants reporting Age at Menarche, the Prodromal Questionnaire (PQ-B), General Anxiety Disorder-7 (GAD-7), Childhood Trauma Screener-5 (CTS-5), and Patient Health Questionnaire-9 (PHQ-9) to screen for depression. All participants consented to take part in the study and were debriefed at the conclusion. In this study, we hypothesized that earlier age at menarche would be significantly correlated with higher PLEs.

**Results:** Our final sample size was $N = 916$ ($n = 465$ females who reported age at menarche analyzed for this current study). Regarding the gender of the total sample, our sample was 50% women, 49% men, and 1% nonbinary. Participants were in their mid-twenties on average ($M^{age}$ =

27.2, *SD* = 4.8). Most participants identified as White (63%) or Black/African-American (14%); 16% identified as Hispanic/Latino/a/x. All participants lived in the United States. The average PQ-B total/frequency score was 5.43 (*SD* = 4.69). The average PQ-B distress/severity score was 1.74 (*SD* = 1.06), close to the *neutral* range. Preliminary analyses indicated a significant negative bivariate correlation (*r* = -16) between age at menarche and PLEs, consistent with hypotheses. Furthermore, women who reported having their period at $\leq$ age 10 had a significantly higher rate of current PLEs, compared to women who reported their period $\geq$ age 12. A multiple regression analysis was conducted; the overall model was statistically significant, $F(4, 448) = 50.78$, $p < .001$, explaining 31% of variance ($R^2 = .31$). The predictors were age at menarche (standardized beta = −.076, $p = .057$), anxiety (standardized beta = .177, $p = .004$), childhood trauma (standardized beta = .141, $p < .001$), and depression (standardized beta = .329, $p < .001$). Depression was the strongest predictor, followed by anxiety and childhood trauma. Age at menarche was non-significant in this model.

**Discussion:** The goal of this study was to continue to add to the growing literature on PLEs, specifically related to women. The association between earlier menarche and PLEs appears to be largely explained by co-occurring psychological factors, including depression, anxiety, and childhood trauma. In the future, a longitudinal design and/or exploration of moderating factors could give insights into the long-term effects of early menarche. Further understanding of psychopathology and how these variables intersect with one another remains important in further clinical treatment and provider understanding. Specifically, the effect of female developmental hormones, particular experiences of childhood trauma, and specific manifestations of anxious and depressive symptoms could shed light on the interaction of these variables. Understanding the different risk factors will be essential in developing preventative measures and aiding further treatment.

# Relationship Between Trauma Proximity, Emotion Regulation, and PTSD Symptoms in Emerging Adults

**Quincy Palmateer, Melia Swenson, Samantha Sullivan**

Faculty Mentor: Dr. Pauline Goger

Meditz College of Arts & Sciences

Booth: 98

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference, 2026*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**

**Introduction:** About 85% of college students report having experienced at least one traumatic event. Trauma exposure has numerous impacts on people's mental health, including one's ability to effectively regulate emotions, with middle school presenting as a sensitive period for trauma to have a more substantial impact on one's emotion regulation skills. Ineffective emotion regulation, in turn, is related to impaired functioning and may be related to a greater chance of developing and maintaining post traumatic stress disorder (PTSD), although the literature remains heterogeneous on this point. Investigating the relationship between the emotion regulation and PTSD symptoms of emerging adults who were in middle school during the COVID-19 pandemic can help us better understand how the prior literature applies to individuals who endured a long term, significant traumatic event during a sensitive period of their emotion regulation development. Additionally, investigating the interaction between proximity to specific types of traumatic events and one's emotion regulation skills can help inform more tailored preventions and treatments for those who have experienced traumatic events that are highly associated with increased emotion dysregulation.

**Methods:** Participants were emerging adults at a liberal arts university in Connecticut ($N$ = 101; ages 18-21; $M_{age}/SD$ = 18.77/0.10; 87.3% female). Participants were recruited as part of a larger study investigating risk and protective factors for suicidal ideation. Participants were asked to complete measures such as the Difficulties in Emotion Regulation Scale (DERS), the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5), and the Life Events Checklist for DSM-5 (LEC-5). The LEC-5 asked participants to endorse a variety of types of traumatic events and if they were experienced, witnessed, heard about, or part of their job. The participants were also asked to answer questions regarding the worst of these traumatic events, defined as the event that currently bothers them the most. Participants endorsed having experienced/witnessed between 0 and 13 ($M/SD$ = 2.72/2.64) different kinds of traumatic events, with 66 participants reporting having experienced/witnessed at least one.

**Results:** A significant interaction was found between emotion regulation difficulties and endorsing that one's worst traumatic event involved one's own life being in danger , $F$ (5, 53) = 17.13, $p$ <.001. Participants who reported their own life (vs. someone else's life) being in danger and reported experiencing the most difficulties with emotion regulation reported the highest PCL-5 total score out of all other groups. However, the worst traumatic event involving someone being seriously injured or killed did not interact with emotion regulation difficulties, $p$ >.05 Outside of participants' worst traumatic events, endorsing a variety of types of trauma was correlated with total DERS scores. The number of types of interpersonal trauma participants endorsed having experienced/witnessed was positively correlated with total DERS score ($r$ = 0.39 , $p$ < 0.01). The number of types of non-interpersonal trauma participants endorsed having experienced/witnessed was also positively correlated with the total DERS score, though less strongly ($r$ = 0.24 , $p$ < 0.5).

**Discussion:** A more proximal experience of potentially life-endangering trauma was associated with increased PTSD symptoms, especially when participants reported increased difficulties with emotion regulation. This aligns with findings in the previous literature that emotion dysregulation may play a role in the development and maintenance of PTSD symptoms. Additionally, the more types of both interpersonal and non-interpersonal trauma individuals experienced/witnessed was associated with increased emotion dysregulation. The relationship is stronger between interpersonal trauma types and emotion dysregulation than the relationship between noninterpersonal trauma types and dysregulation. This could possibly be because often interpersonal traumas are more violent or intense than noninterpersonal traumas, therefore leading to stronger/bigger impacts on emotion dysregulation. These findings aid in our understanding of the relationship between trauma, emotion regulation, and PTSD, for individuals whose sensitive period for emotion regulation was affected by the COVID-19 pandemic. Understanding the implications of traumatic events for these individuals can aid in developing treatments that have taken their unique situations, and potential differences in emotion regulation development, into account. These findings can also help aid in the development of interventions that focus on establishing healthy emotion regulation strategies, especially considering the large number of young people who are affected by potentially traumatic events and have already lived through a significant pandemic.

# An Exploratory Analysis of Parietal Alpha Suppression as a Neural Marker of the Misinformation Effect

**Holly Rahurahu**

Faculty Mentor: Dr. Jessica Karanian

Meditz College of Arts & Sciences

Booth: 99

*This research is affiliated with Sigma Xi*

*This research was also presented at the Northeast Under/graduate Research Organization for Neuroscience (NEURON)*

*This research was supported by the Science Institute and the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**
Eyewitness testimony often plays a pivotal role in convincing a jury to arrive at a particular verdict. Consequently, the weight placed on claims made by witnesses can contribute to an erroneous guilty verdict, partly due to phenomena such as the misinformation effect. Although alpha oscillations have been strongly implicated in top-down regulation of cognitive processes such as memory retrieval, few studies have investigated their relation to false memories. Additionally, the literature suggests that during high psychological arousal states, alpha power decreases which is often interpreted as a reduction in neural inhibition. While the effect of arousal states on memory retrieval has been well researched, the findings on the direction of these effects have been mixed and research surrounding frequency band oscillations in misinformation paradigms is particularly limited. The current study uses multiple methods, including electroencephalography (EEG), psychophysiology measures, and clinical measures to examine the misinformation effect and the moderating effect of stress. We recruited 36 participants to take part in a misinformation paradigm. Participants watched a 22-minute silent video of a non-violent crime and were subsequently exposed to misinformation in an audio retelling. Participants then completed a memory task during EEG. An Empatica EmbracePlus wristband was used to monitor heart rate throughout the experiment. After the memory task, participants completed the Perceived Stress Questionnaire. Consistent with existing literature, memory accuracy decreased on misleading trials, indicative of a misinformation effect. EEG analyses are underway and will be discussed.

# Do Personal Mementos Improve Older Adults' Memory Accessibility and Well Being?

**Olivia Rissetto**

Faculty Mentor: Dr. Linda Henkel

Meditz College of Arts & Sciences

Booth: 100

*This research is affiliated with Sigma Xi*

*This research was also presented at the Association for Psychological Science (Barcelona, May 2026)*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**
Many people keep personal mementos -- objects that serve as reminders of meaningful experiences, people, or events. While these items can evoke nostalgia, their potential to enhance memory accessibility and psychological well-being has received limited empirical attention. The present study examined how older adults' interactions with their cherished mementos shape the accessibility and qualities of their autobiographical memories and impact their feelings of well-being.Older adults over 65 shared either a personal memento they had selected (e.g., souvenirs from vacations, childhood toys, gifts from loved ones) or a neutral, non-nostalgic object from their home (e.g., a hairbrush, a tea kettle) during a one-on-one interview. They discussed the object and its meaning to them, and then completed an autobiographical memory fluency task, where they had to generate as many distinct personal memories from their life as they could in 2 minutes, and then rate various qualities of those memories (e.g., vividness, detail, visual perspective, emotionality).

We predict that interacting with a personal memento rather than an everyday object will elicit more autobiographical memories and that those memories will be more vivid, detailed, and meaningful, and will be from earlier time periods in their life. We also expect the personal mementos will have a positive impact on their feelings of well-being, life meaning, and social connectedness. The study aims to better understand the psychological functions of keepsakes and the role of nostalgia in later life. Findings could have practical implications for designing interventions to support cognitive functioning and emotional well-being in older adults.

# Do Empathic Perspectives Shape Burnout Trajectories? A Longitudinal Experiment with Caregivers

**Elizabeth Ruel**

Faculty Mentor: Dr. Michael Andreychik

Meditz College of Arts & Sciences

Booth: 101

*This research is affiliated with the Honors Program Thesis and Sigma Xi*

*This research was also presented at the Association for Psychological Science (Barcelona, May 2026)*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**
Burnout is a pervasive occupational hazard, particularly in caregiving professions, where attending to the emotions of those who are suffering is a central component of the job. Extensive research has shown that sharing in others' negative emotions (negative empathy) is associated with heightened emotional exhaustion, whereas sharing in others' positive emotions (positive empathy) is associated with more beneficial outcomes. The present study experimentally tested whether adopting different empathic perspectives influences burnout trajectories among healthcare workers. Participants were randomly assigned to positive empathy, negative empathy, or daily events control conditions, and measures of burnout, organizational support, intentions to leave the profession, and personality were collected at baseline and at two- and four-week follow-up intervals. Although the empathy manipulation did not significantly affect other dimensions of burnout or intentions to leave, participants in the positive-empathy condition – but not those in the negative empathy or control conditions – reported higher personal accomplishment over time. These findings suggest that experimentally manipulating empathic perspectives did not impact negative components of burnout, but did enhance nurses' sense of personal accomplishment.

# Question-locked EEG signatures of memory accuracy in the misinformation effect

**Erin Shah**

Faculty Mentor: Dr. Jessica Karanian

Meditz College of Arts & Sciences

Booth: 102

*This research is affiliated with Sigma Xi*

*This research was supported by the Science Institute and the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**
This study investigated the neural underpinnings of the misinformation effect using electronencephalography (EEG). Participants first viewed a silent video depicting a non-violent crime, followed by an auditory narrative that contained consistent, neutral, or misleading information about the original video. During a subsequent recognition memory test about the contents of the video, EEG data were recorded to examine neural activity associated with memory judgments. Analyses focused on event-related potentials (ERPs) time-locked to the onset of each question, capturing neural processes related to memory retrieval with an interest in identifying whether these components differed based on memory accuracy. Components of interest include the P200 (150–250 ms), associated with an early frontal effect likely reflecting the start of a recollection search process, and the FN400 (300–500 ms), which has been associated with familiarity in prior literature. Neural responses were categorized based on hits (correct memory), misses (forgotten memory), and false alarms (misinformation error) allowing for direct comparison between these trial types. The way in which these components differed as a result of memory accuracy will be discussed.

# Exploring the Relationship Between Allergies, Bodily Sensations, and Caffeine Reactivity in College Students

**Samantha Sullivan, Quincy Palmateer, Melia Swenson**

Faculty Mentor: Dr. Pauline Goger

Meditz College of Arts & Sciences

Booth: 103

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference, 2026*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**

**Introduction:** Although allergies are common among college students, surprisingly little research explores how having an allergy, or feeling physically affected by one, relates to mental health, bodily awareness, or daily functioning. Prior work in younger populations has linked allergies to anxiety-related processes, but findings in late adolescents and young adults are mixed. College campuses also vary widely in food safety practices, which may buffer the emotional impact of allergies. Given the gap in the literature, this pilot project examined how different types of allergies (food, environmental, or both) relate to mental health symptoms, emotion regulation, and physiological reactivity among college students.

**Method:** 24 first-year students participated in the study (*M*age = 18.65 year, *SD* = ; 75% female; 87.5% White). Participants answered questions about whether they had diagnosed allergies (food, environmental, both, or none) and rated how much their allergies made them aware of bodily sensations or caused stress. Students also completed standardized measures of depression (PHQ-9), anxiety (SCAARED total and subscales), suicidal ideation (SIQ), and emotion regulation (DERS). Because caffeine is widely used among college students and can mimic anxiety symptoms, we also examined items assessing physiological reactions to caffeine. Analyses consisted primarily of correlations and simple linear regressions.

**Results:** Students who reported that their allergies made them more physically aware or stressed showed a strong and significant association with heightened physiological reactivity to caffeine. $R^2 = .41$, $F(1,22) = 15.10$, $p < .001$). This suggests that students who feel more physically affected by allergies may also be more attuned or reactive to other bodily sensations, particularly those that are triggered by caffeine. However, neither having food nor environmental allergies was associated with mental health outcomes, ps > .05.

**Discussion:** Our findings indicate that higher allergy-related bodily stress predicts strong caffeine-related physical symptoms, suggesting a potential shared mechanism of interoceptive sensitivity. Students who are used to monitoring their body for allergy symptoms may also be

more aware of caffeine-induced sensations like shakiness or nervousness. This pattern aligns with theories connecting somatic vigilance to anxiety-like physiological responses, even when broader anxiety symptoms are not elevated.

Allergies, including more threatening types, were not associated with higher anxiety or depression scores in this college sample, which is notable. This could reflect that students feel like they are in a more protective environment. Fairfield University is known for strong food-allergy accommodations, which may reduce stress among students with allergies. However, one limitation of this study includes the small sample size (only 24 reporting an allergy) and the lack of diversity.

For future studies, it would be beneficial to examine these factors in a larger and more diverse sample and repeat with these same measures, comparing students with life-threatening allergies to those with seasonal allergies to explore whether safety concerns translate into different anxiety profiles.

# Interactions Between Caffeine Consumption, Sleep Quality, and Suicidal Ideation in College Students

**Melia Swenson, Quincy Palmateer, Samantha Sullivan**

Faculty Mentor: Dr. Pauline Goger

Meditz College of Arts & Sciences

Booth: 104

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference, 2026*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**

**Introduction**: Emerging young adults, especially those in college, typically consume caffeine at higher levels compared to during their adolescence or childhood, possibly due to the workload in college or other increased pressures leading to worsened sleep quality and quantity. Previous studies have found that college students with excessive caffeine consumption (e.g., via energy drinks) experienced worse sleep quality, less sleep, and more stress, compared to college students who consumed typical amounts of caffeine, or those who did not consume caffeine at all. With this worsening sleep quality comes a concern for downstream effects on mental health outcomes, such as poor sleep quality being associated with higher rates of depression. In adults, for example, drinking four cups of coffee per day increased suicide risk levels. Emerging adults also reported that poor sleep quality led to excessive caffeine consumption. While all of these factors have been studied separately before, there has not been a study examining sleep, caffeine consumption, and depressive and suicidal thoughts and behaviors (STBs) together in emerging adult populations. Additionally, there is a lack of literature on subjective effects of caffeine (e.g., caffeine withdrawal or psychological symptoms of caffeine) and its' relationship with sleep and suicidal ideation. Understanding these relationships may create the opportunity for future research on interventions and elucidate protective factors that may mitigate these risks.

**Method**: Participants were students at a small-sized liberal arts university in the northeast ($N$ = 101; ages 18-21; $M_{age}/SD$ = 18.77/0.10; 87.3% female). As part of a larger study assessing risk and protective factors for suicidal thoughts and behaviors, participants completed the Suicidal Ideation Questionnaire (SIQ), the Pittsburgh Sleep Quality Index (PSQI), and questions adapted from Luebbe's (2011) beverage questionnaire, to specifically assess caffeine consumption patterns and intake. Caffeine consumption pattern question examples included, "Do you ever have negative symptoms when you do not drink caffeine in a while (often thought of as "caffeine withdrawal"; examples include headache, tiredness, irritability)?" and "Do you ever have any psychological symptoms when you drink caffeine (examples include feeling "buzzed" or "jittery")?" and were assessed on a time-based four-item likert scale with options being 1 (*never*),

2 (*sometimes*), 3 (*often*), and 4 (*always*). About 78.5% of participants endorsed previous caffeine use. The majority of participants were not in the clinical range (total score over 41) in terms of their suicidal thoughts and behaviors ($M$ = 6.54, $SD$=11.70), but 56.6% of participants scored in the clinical range (total score over 23) for anxiety ($M$ =30.17, $SD$=19.23).

**Result**: A moderation analysis showed that feeling negative symptoms stemming from not having had caffeine for a while moderated sleep quality's effect on STBs $F(1, 66) = 17.83$; $R^2 = .20$ ($p < .001$). Participants who experienced more frequent caffeine withdrawal symptoms and reported frequent sleep impairment experienced substantially higher STBs than any other combination of low/frequent sleep impairment and caffeine withdrawal. Endorsing frequent negative symptoms of caffeine withdrawal was associated with high STBs, $t(66) = -2.96$, $p < .01$, as was endorsing high sleep impairment, $t(66) = -2.77$, $p < .01$. However, these main effects disappeared once the interaction was included in the model. Caffeine psychological symptoms were significantly associated with higher depression symptoms ($p < .01$), but this effect was not seen with caffeine withdrawal symptoms.

**Discussion**: Data showed that the frequency of feeling caffeine withdrawal and the severity of sleep quality impairment were associated with STBs, especially when emerging adults reported frequent caffeine withdrawal symptom frequency and high sleep impairment. This links sleep impairment, negative effects of caffeine, and poor mental health outcomes together. This study was able to show the association between caffeine, sleep quality, and STBs, highlighting a risk factor of having high caffeine withdrawal symptoms and high sleep impairment. However, due to the correlative nature of the methodology, causation of this relationship cannot be determined. Additionally, future research in this population should examine how the amount of caffeine consumed per day correlates with anxiety, depression, emotion regulation, and suicidal thoughts. Importantly, the current findings suggest that emerging adults experiencing STBs, sleep impairments, and frequent caffeine withdrawal symptoms might benefit from interventions that consider all of these factors together.

# Strong Right-Wing Authoritarianism Beliefs and Their Impact on Suicidal Ideation and Anxiety

**Melia Swenson, Quincy Palmateer, Samantha Sullivan**

Faculty Mentor: Dr. Pauline Goger

Meditz College of Arts & Sciences

Booth: 105

*This research is affiliated with Sigma Xi*

*This research was also presented at the Anxiety and Depression Association of America*

*This research was supported by the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**

**Background**: Susceptibility to authoritarianism is politically relevant in the current climate. Strong authoritarian beliefs have been linked to higher mental distress and more frequent mental health disorder diagnoses. These beliefs have been shown to be a risk factor for depression in high school students, college students, and in the broader community. The Right Wing Authoritarianism (RWA) Scale measures a person's beliefs about authoritarianism and their authoritarianism tendencies and behaviors. Research has shown conflicting findings, with higher RWA scores are associated with higher depression scores, yet lower mental distress. Overall, better understanding the authoritarian tendencies in college students and their link to depression and suicidal ideation may inform future interventions to protect student well-being.

**Method**: Participants were students at a small-sized liberal arts university in the northeast ($N$ = 110; ages 18-21; $M_{age}/SD$ = 18.77/0.10; 87.3% female; 97.5% White). As part of a larger study assessing risk and protective factors for suicidal thoughts and behaviors participants were assessed through measures such as the Suicidal Ideation Questionnaire (SIQ), the Screen for Adult Anxiety Related Disorders (SCAARED), the Social Dominance Orientation (SDO) scale, and the Right Wing Authoriarianism (RWA) scale. The mean RWA total score was 74.67, on par with the average of 75 reported by Dr. Bob Altemeyer, the developer of the scale. The majority of participants were not in the clinical range (total score over 41) in terms of their suicidal thoughts and behaviors ($M$ = 6.54, $SD$=11.70), but 56.6% of participants scored in the clinical range (total score over 23) for anxiety ($M$ =30.17, $SD$=19.23).

**Result**: Results showed higher right wing authoritarian belief total scores negatively correlated with suicidal thoughts and behaviors ($r$ = -.37, $p$ = .003). Authoritarian belief total scores also negatively correlated with anxiety total scores ($r$ = -.36 $p$ = .004). Authoritarian belief total scores did not have an association with depression scores. SDO total scores did not correlate with either of the mental health outcomes.

**Conclusion**: Previous research has shown inconclusive results surrounding the effects of right wing authoritarian beliefs on suicide and depression. However, this study showed a negative correlation between authoritarian belief scores and both suicide and anxiety measures.

It is possible in the current political climate, stronger authoritarian beliefs may be associated with reductions in mental health concerns. This may be due to feelings of belonging and acceptance of thoughts that may not have been considered mainstream previously. Additionally, this may be due to having a strong belief system, which may lead individuals to feelings of purpose and connectedness among those who share their opinions. This sample was predominantly white, Roman Catholic, and had parents' who received college education or further graduate education, which makes this sample unique, and results should be interpreted with these demographics in mind. Interestingly, we found that SDO scores were not associated with authoritarian belief total scores, even though some scholars have theorized that SDO and RWA scales may be measuring similar constructs. Future research should probe what aspects of the strong right wing authoritarianism beliefs may yield lower SIQ total scores, and if that relationship changes depending on strong beliefs and belonging in groups.

# Adolescent Social Isolation and Resveretrol Treatment: Effects on Behavior in Male Rats

**Mia Van Mater, Marikate Kenny, Maria Jobes, Claire Surprenant**

Faculty Mentor: Dr. Shannon Harding

Meditz College of Arts & Sciences

Booth: 106

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference, 2026*

*This research was supported by the Science Institute, the Dr. Kathleen B. Trainor Psychology Fellowship, and the Lawrence Family Fund*

**Abstract:**
Social isolation during adolescence can increase the risk for developing anxiety and depression later in life, as adolescence is a critical period of development. Previously, our lab has shown that adolescent social isolation in Long-Evans rats produces impairments in cognition, anxiety-like, depressive-like, and addictive behaviors as assessed with different behavioral tests. One potential treatment is resveratrol (RSV), a naturally occurring compound that has anxiolytic properties. The present study examined the impact of adolescent social isolation (SI) and RSV treatment on behavior in male rats. Rats were housed individually (SI) or in groups of three (GH: Group Housed) and received either water or RSV throughout adolescence, resulting in four experimental groups (n=9 per group). After 5 weeks of treatment, rats were assessed using the Elevated Plus Maze (EPM), Marble Burying test, and Morris Water Maze (MWM). Results indicate that social isolation increased anxiety-like behaviors in the EPM and impaired spatial learning in the MWM. RSV treatment improved spatial retention in the MWM. Additionally, social isolation was associated with reduced testes weights and increased weight gain in male rats. On going work is examining these effects in female rats. This research has important implications given the recent experience of social isolation by adolescents during the COVID-19 pandemic.

# Using EEG to Elucidate Early Differences During the Retrieval of Misinformation

**Maya Walker, Manuela Baranowski, Olivia Bonacci, Korinne Hennelly, Holly Rahurahu, Erin Shah**

Faculty Mentor: Dr. Jessica Karanian

Meditz College of Arts & Sciences

Booth: 107

*This research is affiliated with Sigma Xi*

*This research was also presented at the Eastern Psychological Association Conference, 2026*

*This research was supported by the Science Institute and the Dr. Kathleen B. Trainor Psychology Fellowship*

**Abstract:**
Many studies have shown that exposure to misleading information can alter memory, a phenomenon known as the misinformation effect. Neuroimaging research suggests that sensory and executive control regions are crucial in processing misinformation, yet their temporal dynamics remain underexplored. Event-related potentials (ERPs) have revealed distinct neural activity patterns that support the retrieval of accurate versus inaccurate information. Specifically, the Late Positive Component (LPC, 400-800ms) exhibits reduced amplitude for misinformation retrieval, while the frontal N400 (FN400, ~300–500 ms), shows familiarity-based processing that is more negative for misinformation. Additionally, the P300 component (250–500 ms) indicates conscious episodic recollection, and displays larger amplitudes for accurate information compared to misinformation. In our research involving 65 participants, a misinformation paradigm was used, confirming a significant misinformation effect, with higher accuracy on consistent than misleading trials. ERP analyses revealed differences in the LPC and FN400 between trial types; specifically, LPC activity was greater for consistent trials at centro-parietal sites (CP3, CP5), and FN400 was more positive for consistent information at right frontal sites (FC2, FC6, F4, F8). However, no significant P300 effects were observed. Limitations include a low number of trials and the need for ongoing data collection to address power issues and verify the effects of FN400, possibly by exploring the N450 component. Future research will investigate the influence of pre-testing intervention as well as warnings about misinformation on these ERP components.

# Exploring Mental State Language and Storybook Grammar Elements in Children's Scientific Narrative Storybooks

**Morgan Zickendrath, Katelyn Bagley, Kayleigh Mezick**

Faculty Mentor: Dr. Amanda Haber

Meditz College of Arts & Sciences

Booth: 108

*This research is affiliated with Sigma Xi*

**Abstract:**
From an early age, the language in narrative science books has been shown to promote children's understanding of scientific concepts and causal processes in STEM (Brown et al., 2020; Ganea et al., 2011; Leech et al., 2020). Arguably, the language in such scientific narrative books may impact more than just scientific learning outcomes: it may also impact children's motivation, engagement, and interest in STEM. Findings from recent research indicate that when caregiver-child dyads read storybooks focusing on a scientist's effort and failure along the path to success (rather than a story focusing solely on achievement), their conversation focused on the relation between hard work and success in STEM (Haber et al., 2024). Further, children also persisted longer on a challenging task and endorsed more of a growth mindset. Mental state language (focusing on beliefs, desires, and intentions) in narrative science books may encourage children to view challenges as learning opportunities in STEM (normalizing failure as a fundamental part of the process of science), which in turn, can impact their early engagement in STEM.

Additionally, grammar elements in such scientific narrative books impacts children's ability to make inferences to support narrative comprehension (Van Kleeck., 2008) Findings from recent research indicate that there is strong evidence that children infer goal plans of actions and make causal inferences during reading (Van Kleeck., 2008). Inferences are essential for guiding children to answer questions about the information shared in books and encourage classroom participation. Story grammar elements provide the causal structure children need for deeper understanding of storybooks and to build internal representations of literature.

Yet, little research has examined grammar elements and mental state talk found in children's STEM storybooks. To address this gap, we conducted a quantitative content analysis of a sample of commercially available narrative science books (n = 228) for early childhood (written for children aged 3-6). Our coding focused on three areas: First, in line with previous work (Bartsch & Wellman, 1995; Haber et al., 2024; McLoughlin et al., 2020), we coded for evidence of four types of mental state language: Cognition, Emotion, Desire, and Intention. Second, adapted from the Next Generation Science Standards (NGSS, 2013), we coded for the primary science domain (topic): Physical Science (chemistry, physics), Life Science (biology, plants, animals), Earth/Space Science (geology, meteorology, astronomy), Engineering/Technology (design of machines, tools) and Science Processes (e.g., hypothesis, experimentation, data analysis). Third,

adapted from the Story Grammar elements Rating Scale( Stein & Glenn, 1979), we will be coding for initiating events taken by the main character, presenting goals of the main character, attempts to achieve a goal, and direct consequences faced by the main character.

Overall, the majority of narrative science books focused on Life Science (65.35%), Physical Science (17.54%), and Engineering/Technology (21.49%) rather than Science Processes (10.09%) or Earth/Space Science (11.84%). Results indicate that out of n = 4,354 pages of coding (across n = 228 books), 33.69% (n = 1,467) of pages included mental state language. Out of the total pages with mental state language, 39.33% was coded as Cognition, 18.81% was coded as Intention, 24% was coded as Desire and 17.86% was coded as Emotion. The coding for Story Grammar elements is currently in progress. Further analyses examine specific Story Grammar Elements for understanding how narrative structure in children's books can be used in future empirical research to further promote children’s STEM engagement during early childhood.

# Supercritical High Speed Drive Shaft Balancing Rig Refinement

**James Bossone, Ryan Bordsen, Maximilian Lindeis**

Faculty Mentor: Dr. Naser Haghbin, Dr. Sriharsha Sundarram

School of Engineering and Computing

Booth: 109

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
This project, in association with Sikorsky Aircraft, focuses on the modification, troubleshooting, and baseline evaluation of an existing supercritical high-speed driveshaft balancing rig. This addresses the need for accurate vibration analysis and imbalance detection in rotating machinery. This work is motivated by applications such as helicopter drivetrain systems, where imbalance can lead to excessive vibration, reduced performance, and potential failure. The objective of this project was to modify and test an existing rig designed for operation up to approximately 23,000 RPM while accurately measuring vibration and rotational data through sensors integrated into the rig. This system consists of a custom-made mechanical rig integrated with a National Instruments cDAQ data acquisition system. Four accelerometers are used to capture vibration response, while an optical sensor provides rotational speed and phase reference information. A LabVIEW interface was redeveloped and refined to enable synchronized data acquisition, real-time visualization, and data logging, addressing timing mismatches in the original setup and improving measurement accuracy and reliability. Troubleshooting was performed by evaluating inconsistencies in the optical sensor signal at higher rotational speeds and comparing its performance against expected pulse outputs. Based on these observations, a diffuse-reflective mark detection sensor was researched and purchased, focusing on response time, setting distance, detection reliability, and compatibility with the data acquisition system. A spline coupling is currently being incorporated into the driveshaft balancing rig to better simulate real-world helicopter driveshaft conditions. The coupling is being designed and aligned for installation between the motor and shaft to replicate realistic torque transmission and shaft interaction. Experimental testing was conducted at approximately 6,000 RPM to establish baseline measurements prior to higher speed testing. Time-domain and frequency-domain analyses, including FFT, were performed to assess vibration behavior. The results showed consistent vibration signals across multiple trials, with similar amplitude and frequency content observed between runs. These baseline results provide a foundation for future implementation and validation of the balancing algorithm at higher operational speeds. Future work will focus on completing spline integration, refining signal processing methods, and conducting testing at higher rotational speeds.

# HMI for Digital Actuator Control on Manual Drill Lathe

**Joseph Caminiti, Findley Lacey, Peter Fox**

Faculty Mentor: Dr. Akshay Mathur, Dr. James Cavallo

School of Engineering and Computing

Booth: 110

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
This project presents the design and implementation of an automated turret rotation and feed control system for a Derbyshire drilling machine, aimed at improving precision, efficiency, and operator usability. The system integrates mechanical automation with enterprise data systems to streamline drilling operations and reduce manual intervention. A NEMA 17 stepper motor with linear actuation is used to precisely control the tool carriage sled and index the turret, enabling accurate and repeatable multi-tool drilling sequences. A key innovation of this work is the seamless integration with the Epicor ERP system via REST API, allowing automatic retrieval of job parameters such as part number, material classification, tool count, feed rate, spindle speed, and drilling strategy. This eliminates the need for operators to directly interact with the ERP system. Instead, a guided, user-optimized interface,developed using React, TypeScript, and Material UI, leads the operator through a structured seven-step workflow, including login, job initialization, machine setup, and production monitoring. The system maintains operator flexibility by allowing manual job lookup, parameter adjustments, and joystick-based control for precise tool zeroing. Once configured, the automated drilling cycle executes predefined sequences, including rapid positioning, controlled feed, turret indexing, and optional peck drilling. Safety features such as protective housing, emergency stop functionality, and pre-operation requirements ensure safe operation. By bridging ERP-driven data with physical machine control, this system enhances process consistency, reduces setup time, and minimizes human error in precision drilling applications.

# Aquila’s Nest Vineyard: Centralized Event and Vendor Management Portal

**Christina Collazzo, Brooke Kaplan, Tashfia Ahmed**

Faculty Mentor: Dr. Akshay Mathur

School of Engineering and Computing

Booth: 111

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
Aquila’s Nest Vineyards organizes hundreds of food truck bookings, musician reservations, private events, and public programs annually. This information was previously stored across over a dozen Excel spreadsheets. This created organizational challenges such as limited visibility, time-consuming manual searching, and the risk of scheduling inconsistencies. To address these issues, our senior design team developed a centralized Event & Vendor Management Portal that combines all scheduling and vendor and event information into a single web-based platform. The system consists of a month-to-month calendar view, vendor management tools, private event tracking, and role-based authentication. An AI-powered recommender system provides recommendations for event ideas, vendor pairings, and seasonal scheduling patterns in a chatbot interface. The portal is built using a Flask backend with HTML/CSS front-end pages, a structured database, and a data driven AI module that leverages historical data from Aquila’s Nest. The calendar loads efficiently, vendor data populates correctly, and the AI system generates relevant event suggestions. The solution streamlines all planning operations by eliminating the reliance on spreadsheets, reducing the need for manual entry, and offering intelligent, data-driven insights backed by frequency and seasonality. The project shows the successful combination of skills in web development, database management, and natural language processing within a real-world client environment, fulfilling all design and engineering standards required by the Senior Design course.

# Development of a Machine Learning Algorithm for Injury Prevention and Rehabilitation of Achilles Tendinopathy using Wearable Sensor Data

**Mitorphan Ganson, Philip Byrne, Quinn McGonigle, Anna Paravati**

Faculty Mentor: Dr. John Drazan

School of Engineering and Computing

Booth: 112

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
Achilles Tendinopathy is a chronic overuse injury, primarily affecting the middle-aged and athlete population, that leads to Achilles tendon degeneration, with recovery often delayed due to poor patient compliance with expensive and time-intensive rehabilitation programs. These non-surgical rehabilitation programs aim to heal the Achilles tendon through exercises which load the triceps surae during an eccentric contraction. However, no non-invasive methods to determine which contraction the triceps surae undergoes during loading currently exists. The aim of this study is to create a muscle contraction classification algorithm which can determine the type of contraction the triceps surae undergoes during loading, solely using sensor data from insole force plates and accelerometers attached to the foot and shank. The classification algorithm was trained from sensor data collected by a pair of insole force plates (Loadsol, Novel Electronics inc.), IMU sensors attached to the foot and shank, and an ultrasound probe attached to the gastrocnemius lateralis (Telemed Medical Systems S.r.l) as subjects performed calf raises, jumps, and a short walk. From this setup, force and accelerometer sensor data were correlated with fascicle velocity and pennation angle from ultrasound video frames to determine which type of contraction the triceps surae underwent. Using this novel approach to classify muscle contractions, we hope to identify which activities of daily living allow for therapeutic eccentric loading of the triceps surae.
To improve patient compliance, this study aims to determine which activities of daily living provide ample therapeutic loading. In doing so, it will be easier for patients to incorporate therapeutic loading into everyday life, ensuring better compliance to their rehabilitation programs. Determining which activities of daily living are beneficial to patient healing depends on classifying the type of contraction in the triceps surae. It has been found that the most therapeutic loading for Achilles tendon recovery occurs when the triceps surae is undergoing eccentric contraction. This study aimed to develop a Machine Learning Algorithm to effectively classify the state of contraction based on wearable sensor data. A combination of wearable sensors (IMUs and Loadsols) was used to collect data on the lower leg, synchronized with imaging captured by an Ultrasound probe attached to the triceps surae. During tests, the sensors were attached to volunteer subjects in accordance with experimental methods, and they performed 2 sets of 3 exercises: 2 forward steps, 2 calf raises, and 2 single-leg vertical jumps. DLTrack and

ImageJ were used to measure changes in triceps surae muscle fascicle length in the ultrasound videos, as they correlate to contraction states. The Machine Learning Algorithm was trained with the synchronized fascicle length and wearable sensor data to determine how ground reaction force, acceleration, and angular velocity of the lower leg correlate to eccentric contraction of the triceps surae.

# Project ISO

**Sarah Liu, Isabella Fuierer, Aldino Guadagnino**

Faculty Mentor: Dr. Andy Judge

School of Engineering and Computing

Booth: 113

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
In semiconductor manufacturing, airborne particulates have a significant impact on the performance of semiconductor components, making cleanroom environments a necessity. However, traditional cleanrooms are expensive, difficult to set up, and largely inaccessible, especially for academic and small-scale research settings. This project presents a compact, portable cleanroom chamber that meets ISO Class 6 (≤35,200 particles ≥0.5 μm/$m^3$) standards, designed for research and testing. This will be achieved using a HEPA filtration unit, which will provide a laminar flow environment with a positive pressure differential, minimizing the impact of external contaminants on the environment within the cleanroom chamber. A mechatronic handling system will be used for manipulating components within the cleanroom, while a telemetry system will be used for real-time monitoring of the environmental parameters, with results displayed on a browser-based interface. Preliminary results demonstrate a cost-effective approach to contamination control, with potential applications in microfabrication, education, and early-stage research.

# Automated Loading Device for ID Plate Engraving

**Stephen Luccarelli, David Tello, Ryan Van Allen, Sarah Dorgan**

Faculty Mentor: Dr. Djedjiga Belfadel

School of Engineering and Computing

Booth: 114

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
Biomerics, a medical device manufacturer that designs, develops, and produces complex interventional medical devices, making reliability, accuracy, and efficiency especially important in its production environment, currently relies on a manual process to sort and orient engraved ID plates before they are loaded into a cartridge for robotic laser engraving. Because each plate contains important medical information, safe, accurate, and consistent handling is essential. The current process is time consuming, labor intensive, and creates opportunities for human error in plate orientation. The objective of this capstone project is to design and implement an automated system that improves efficiency, ensures consistent orientation, and reduces dependence on manual labor while maintaining high accuracy and reliability.The proposed solution replaces the existing cartridge-based workflow with an automated handling system that integrates a vibratory bowl feeder, a camera-based detection system, and a pneumatic solenoid mechanism. Plates are introduced in bulk into the vibratory feeder, which uses controlled vibration and track geometry to begin the orientation process. As the plates progress through the system, a camera detection unit verifies their orientation in real time. Plates that are correctly oriented continue forward, while improperly oriented parts are identified and redirected using a pneumatic solenoid. This closed-loop system ensures that only properly aligned plates are delivered for engraving, eliminating the need for manual sorting and cartridge loading.Development efforts to date have focused on the design, setup, and testing of the vibratory bowl feeder, camera detection system, and pneumatic device. These components have demonstrated the ability to handle and identify plates with a reasonable degree of accuracy, though further refinement is required to improve consistency and reduce misclassification. Current work is centered on optimizing the interaction between these subsystems and preparing for full system integration.Once fully implemented, the automated system is expected to significantly streamline the plate handling process by reducing cycle time, minimizing human intervention, and improving overall reliability. In addition to increasing operational efficiency, the system will allow Biomerics to reallocate labor resources to higher value tasks within its production environment.

# Characterization of Bacteriorhodopsin-based Thin Films

**Emma Maselli, Phil Sgobba, Trent Brown**

Faculty Mentor: Dr. Isaac Macwan

School of Engineering and Computing

Booth: 115

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
Retinal degeneration causes loss of light-sensing cells, creating a need for materials that convert light into electrical signals for artificial retina devices. This project investigated bacteriorhodopsin (BR) based multilayer thin films as a light-responsive coating, examining how fabrication influences their structure and function. Layer-by-layer assembly forms the BR films, enabling the study of the relationship between layer number and performance. Dacron is used as a substrate for Scanning Electron Microscope (SEM), electrochemical impedance spectroscopy (EIS), and photocurrent testing due to its flexible, porous structure relevant to implant design. While mica is used as a substrate under Atomic Force Microscopy (AFM) for its smooth surface, enabling clearer nanoscale imaging of BR patches. Dynamic mode on the Naiosurf NAI AFM examines surface topography, measures height changes as layers increase, and provides insight into the film growth. SEM assesses surface morphology, and elemental analysis verifies protein deposition. ImageJ quantifies pore coverage across different layer counts to determine how effectively the BR film fills the Dacron scaffold. EIS evaluates interfacial charge transport, while photocurrent testing determines whether the films generate a measurable light-driven electrical response. Together, these methods connect film structure with device performance.

# Automated Acoustic Data Processing for Textile Analysis

**Keara McEnroe, Cameron Palmer, Liam Peters**

Faculty Mentor: Dr. Haolin Tang

School of Engineering and Computing

Booth: 116

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
This project focuses on developing an automated system for processing and analyzing acoustic data used in textile softness testing at Henkel's Trumbull facility. Traditional methods of evaluating textile softness rely on subjective human perception, while acoustic frequency response provides a more objective and quantifiable measurement. However, existing data handling processes present challenges related to efficiency, consistency, and data reliability.
To address these limitations, our team designed and implemented an end-to-end data processing pipeline that automates the analysis of acoustic signals generated during textile testing. The system imports WAV audio files, processes them using Python-based signal analysis tools, and extracts key frequency metrics. Results are automatically stored in a structured SQLite database and presented through a user-friendly graphical interface. The solution integrates frontend and backend components, enabling seamless data flow from user input to final analysis. Key challenges addressed include optimizing processing for large audio files, reducing manual labeling errors through automated metadata parsing, and ensuring consistent system architecture across all components. This system improves efficiency, enhances data reliability and supports more informed decision making in industrial textile analysis.

# Anomaly Detection and Localization in Water Distribution Systems

**Brayden Meech, Lauren VonHassel, Reid VanTrieste, Claudia Hepfer**

Faculty Mentor: Dr. Sidike Paheding

School of Engineering and Computing

Booth: 117

*This research is affiliated with Sigma Xi, the Engineering Senior Design Team, and Climate, Coastal and Marine Studies*

**Abstract:**
This project develops machine learning models to detect and localize leaks and anomalies in water distribution networks, a critical problem for utility companies facing water loss, unnecessary maintenance costs, and operational inefficiencies. In collaboration with Recursive AI, a company applying AI to sustainability challenges, our work combines Long Short-Term Memory (LSTM) networks and Graph Neural Networks (GNNs) to capture both temporal patterns in sensor data and spatial relationships between network components. By modeling how anomalies evolve and propagate through interconnected systems, the project provides a more robust and scalable solution than traditional approaches.Through extensive testing on the LeakDB dataset, the team evaluated multiple models, including LSTM, GNN, and XGBoost, measuring performance with standard evaluation metrics such as ROC-AUC, F1 score, recall, and precision. Results indicate that these models can accurately predict leaks while balancing false positives and negatives, demonstrating practical potential for reducing water waste and lowering operational costs. The team concluded that the most effective approach is the integration of LSTM and GNN architectures.Current development focuses on integrating these models into a unified pipeline, improving accuracy and robustness, and developing a user-friendly interface for operators to monitor real-time anomalies. Overall, this project advances AI-driven monitoring for sustainable water management, helping utilities save resources while improving reliability and environmental impact.

# Measuring Cable Tension on an Assembled da Vinci Robotic Surgical Instrument

**Timothy O'Keefe, Luke Bornstein, Luis Mendizabal**

Faculty Mentor: Dr. Ana Estrada, Dr. Isaac Macwan

School of Engineering and Computing

Booth: 118

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

*This research was also presented at the Northeast Biomedical Engineering Conference*

**Abstract:**
The da Vinci robot, from Intuitive Surgical, is a cutting-edge surgical robot in which various robotic arms interact with patient anatomy during minimally invasive procedures. The surgeon controls the arms remotely from a console, which precisely mimics the surgeon's hand motions, reducing the risk of human error. To each robotic arm, various detachable surgical instruments can be applied, each performing a unique surgical function. Surgical instruments rely on precisely tensioned cables to ensure accurate, reliable, and safe use during surgical procedures. Currently, these detachable instruments lack a method for directly measuring cable tension, creating an unmet need for quality assurance teams and maintenance engineers. As a result, instruments such as the da Vinci Large Needle Driver are replaced after a fixed number of uses, regardless of their mechanical condition. This approach may contribute to unnecessary instrument replacement and limit the opportunity for maintenance, which can help improve instrument lifespan. By extending the lifespan of instruments, costs that come from instrument replacement can be reduced, making the cost of surgery cheaper for patients. The objective of this project is to design and manufacture a cable tensiometer capable of measuring cable tension on a fully assembled Large Needle Driver instrument. The device must be capable of accurately measuring tension within 5% and provide repeated and feasible use to safely interact with the instrument's delicate components without causing cable damage. Each of the driving cables are approximately 0.02 inches in diameter. Existing cable tensiometers are unable to be used as they are designed for larger-scale applications such as aircraft cables, elevator cables, or suspension systems, and are incompatible with the smaller profile of a surgical instrument. The proposed design uses small hooks attached to a stepper motor-driven actuator, applying a controlled, known force, resulting in a maximum of 0.25 in of cable deflection. The cables will push on a shaft, applying a force on a custom Wheatstone Bridge load cell. The load cell, which has four strain gauges of 350-ohm resistance, measures a voltage change. This voltage change is proportional to the cable reaction force, which is converted into real-time tension values via data acquisition from an Arduino. At the current stage, the device is in the prototyping stage, with the main frame nearing completed manufacturing. Upon manufacturing, the load cell and actuation systems will be implemented into the device for calibration testing and repeatability studies. When completed,

the device is expected to extend instrument lifespan, reduce costs, and improve reliability in robotic surgery through quantitative and predictive maintenance.

# Redirect Rover

**Aidan Perry, James Nieto, Patrick Daniello**

Faculty Mentor: Dr. Ana Estrada

School of Engineering and Computing

Booth: 119

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
The purpose of this project is to construct an automatic treat dispenser to better train dogs who possess aggressive behavior or are easily agitated. This battery powered device uses an arduino board to move a well using a continuous servo motor that will dispense treats into a dish where the dog will eat from. Our device will have a notch that when turned will begin to spin the wheel, with it gradually increasing in increments of 1, 3, and 5 treats per second. Additionally, There is a button which when pressed, will randomly adjust the speed the wheel is moving in parallel to the notches speed every 1 to 5 second. This causes the dog to be more engaged, as they will not know when they will be receiving the treat. This method of training dogs is more effective than manually receiving treats from a trainer due to the more consistent rate the treats will be delivered to the dog, as well as the lack of strain the trainer will endure in their wrist/arm when delivering treats.

# Conversion of Raspberry Pi to Windows 11 OS Based PC Control of Micro-Orifice Tuner

**Matthew Pogwist, Andrew Crandell, Joseph Parise, Rick Daytec**

Faculty Mentor: Dr. Subhrajit Majumder, Dr. Djedjiga Belfadel

School of Engineering and Computing

Booth: 120

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
This senior design project focuses on the modernization, migration, and enhancement of a micro-orifice tuning system originally developed on a Raspberry Pi platform for O'Keefe Controls. While functional, the existing system presented limitations related to hardware dependency, maintainability, and cybersecurity. These challenges motivated the development of an updated solution leveraging a Windows 11–based environment to improve system compatibility and sustainability.The primary objective of this project is to transfer the micro-orifice tuner from its embedded Raspberry Pi implementation to a desktop-based architecture. This transition enables improved integration with modern development tools, standardized system updates, and more flexible software deployment. Operating within a Windows 11 environment also allows for better alignment with O'Keefe's existing systems, including network and security infrastructure.In addition to the tuner migration, this project includes the continuation and adaptation of an existing automated calibration system. The calibration functionality, originally developed on a Raspberry Pi, is used to calibrate flow control orifices and generate certification outputs. It was transitioned to operate within the new environment while preserving its original functionality. A Docker-based container setup was utilized to ensure consistent deployment and execution across systems.Development was conducted using Visual Studio Code, with version control and collaboration managed through GitHub repositories provided by O'Keefe Controls. The project followed structured software development practices, including iterative testing, debugging, port reconfiguration, and hardware communication adjustments to ensure compatibility with existing instrumentation and Arduino-based control systems.Upon completion, the system results in a fully operational micro-orifice tuner application alongside a successfully migrated calibration system. The updated solution reduces hardware dependency, improves system integration, and establishes a more maintainable framework for future development within industrial flow control applications.

# Drone-based pneumatic excavation system for landmine clearance

**Thomas Pris, Tyler Panourgias, Jack McKenna, Andrew Mejia Hernandez**

Faculty Mentor: Dr. David Shekhtman, Dr. Djedjiga Belfadel

School of Engineering and Computing

Booth: 121

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
This project explores the development of a drone-based adaptation of traditional ground demining robots, aiming to create a compact manned aerial system capable of operating in hazardous areas to minimize human risk. This system integrates a custom, lightweight quadcopter frame equipped with brushless motors, a PixHawk flight controller running ArduPilot, and a compressed-air mechanism designed to deliver a sonic jet of air at 45.9 psig to a 20 cm x 20 cm landmine-located plot. IMU- and ultrasound-based feedback are implemented for precise altitude control during landmine soil excavation. Future improvements will focus on introducing autonomous navigation, sensor-based ground detection, and remote control of compressed air delivery.

# Identifying Synthetic Tissue Substitute(s) for Porcine Vessel Models

**Michael Queenan, Joseph Maucieri, Erin Gibbons, Kaitlyn Murphy**

Faculty Mentor: Dr. Isaac Macwan, Dr. Ana Estrada

School of Engineering and Computing

Booth: 122

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
Ligation clips are used to seal small to medium blood vessels in minimally invasive procedures, and their burst pressure performance is commonly evaluated using ex vivo porcine vessels. However, porcine tissue is expensive, time consuming to harvest, and mechanically variable. This project aims to develop a synthetic vessel substitute that matches the geometry and burst pressure of a human carotid artery while providing a repeatable, lower cost alternative for Intuitive Surgical's clip testing. Thermoplastic polyurethane (TPU) tubes with an electrospun nanofiber "veil" were investigated as the primary design concept. Using a premixed TPU solution, electrospinning at 17 kV, 0.2 mL/hr, and 14 cm tip-to-collector distance produced continuous fibers. Substrate trials showed that fiber deposition was most dense on conductive porcine tissue and improved when polymer tubes were mounted on a copper wire. Burst pressure testing of porcine vessels, analyzed with Tracker software, produced valid failures between 1650 and 3000 mmHg and highlighted both tissue variability and mounting challenges. Even though a finalized synthetic vessel has not yet been achieved, literature review shows that TPU is the most suitable material for artificial vasculature. If successful, these methods can be used to develop additional porcine vessel substitutes for different types of porcine vessels.

# Calzone BOM: Modernizing the Bill of Materials System

**Nicole Reagan, Ryan Lindley, Alyssa Watral**

Faculty Mentor: Dr. Collin Beaudoin

School of Engineering and Computing

Booth: 123

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
Our team developed a secure, scalable, and user-friendly bill of materials (BOM) system for Calzone Cases, the largest custom-designed protective case manufacturer in the United States. By replacing their previous, error-prone BOM with a React-based interface, the new system aligns with industry standards and provides a modern, efficient user experience. Built using Python, MySQL, JavaScript, and Azure, the platform enables accurate pricing of materials and labor, allowing the sales team to generate custom quotes more reliably and efficiently.

# Redesign and Development of a Warehouse Cleanout to Reduce Single-Source Dependency

**Charlotte Savigny, Peter Racanello, Michael Del Monaco, Aiden Samperi**

Faculty Mentor: Dr. Naser Haghbin, Dr. Srinivas Sundarram

School of Engineering and Computing

Booth: 124

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
Warehouse drainage systems require cleanouts approximately every 75 feet for pipes 5 inches in diameter, resulting in hundreds of units per facility. Current solutions are often sourced from a single manufacturer, leading to high costs, long lead times, and limited flexibility. Working with ARCO Design/Build, this project focuses on reducing single-source dependency through the redesign and development of an alternative warehouse cleanout. The redesigned cleanout incorporates modular components, an airtight and watertight plug, and adjustable features for flush floor installation. Relevant ASME standards were applied to guide the connection design between the cleanout and the pipe. Material selection, including cast iron with a bronze plug, was examined through FEA simulations and DFMA principles. Prototype development and manufacturer collaboration supported iterative design improvements. The redesigned cleanout was developed to meet existing cleanout specifications, including a height range of 14 to 17 inches, an outer diameter of 6.5 to 8.5 inches, and an inner diameter of 6 to 7 inches. By giving ARCO greater control over design and fabrication, this work creates a pathway to reduce dependence on external suppliers and improve long-term supply flexibility for warehouse construction.

# P-Lock Design Review and Optimize

**Luke Wagher, Kevin Alvarez, DennisJames Morrelli**

Faculty Mentor: Dr. David Shekhtman

School of Engineering and Computing

Booth: 125

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

**Abstract:**
This project investigates the failure of a P-Lock, designed by GK Mechanical Systems, and suggests solutions to satisfy required load and spatial constraints. The original two P-Lock prototypes were respectively built out of 440C and 17-PH H900 martensitic stainless steels and each fractured at a force of 3600 lb. The desired load to hold with a healthy safety factor is 5000 lb, while keeping the same size body and internal mechanism. Analysis of the initial design using SolidWorks and Ansys showed enormous bending and shear stresses, so redesigns were explored to mitigate these stresses. While analyzing the prototype, large compression stress was calculated, so options were explored to decrease this stress. These redesigns included a prototype pin with a flat portion on the top as well as a D-shaped profile at the end of the cylindrical pin. Unfortunately, physical modifications to the locking pin were limited, so coatings were researched next. Titanium Carbonitride (TiCN) was selected to coat the pin, and simulations show the design will hold with a small safety factor of approximately 1.6. This design should not be manufactured due to the safety factor being less than 2 during a potential dynamic loading situation. Ultimately, redesigning the current P-Lock to hold the desired load and have a sufficient safety factor with the given spatial constraints is not feasible. Potential of future designs will require altering the spatial constraints.

# Single Handed DragonWing Autograft Delivery Device

**Kylie Wistran, Joseph DiDomenico, Jennifer Gjonaj, Michaela Nanna**

Faculty Mentor: Dr. Susan Freudzon

School of Engineering and Computing

Booth: 126

*This research is affiliated with Sigma Xi, and the Engineering Senior Design Team*

*This research was also presented at the Northeast Biomedical Engineering Conference*

*This research was supported by the Corrigan Scholars*

**Abstract:**
The Avitus/Zimmer DragonWing bone graft delivery device currently requires two-handed operation, limiting surgeons' independence and flexibility while adding complexity to orthopedic procedures. This project aims to redesign the DragonWing to enable accurate one-handed operation while preserving its ability to deliver 5 cc of autograft through the existing cannula geometry and to meet force, weight, and compatibility requirements. Industry mentors provided the following key specifications: the plunger must deliver at least 75 N of force, the total device must weigh less than 200 grams, and it must be sized according to small-hand anthropometric data to ensure a comfortable grip. With these constraints, the team generated more than 25 preliminary concepts, which were refined into three main models: a manual rack-and-pinion, a motorized rack-and-pinion, and a motorized worm gear. Iterative prototyping and mechanical testing were conducted to validate single-handed functionality and compatibility with current DragonWing components. These models were created in SolidWorks and then 3D-printed for testing with a force gauge. Mechanical rack-and-pinion prototypes progressed through multiple iterations, increasing measured output from 22 N to 108 N before experiencing gear failure at high loads. The motorized rack-and-pinion prototype, sized using torque and gear-ratio calculations, achieved a maximum force of 132.5 N and a steady force of 38.5 N, exceeding the plunger force requirement. In contrast, the worm gear concept did not produce sufficient force. These results demonstrate that a compact, motorized rack-and-pinion mechanism can enable one-handed DragonWing actuation, laying the groundwork for next semester's integration of device geometry, ergonomics, and lab testing to improve surgical workflow, reduce staffing demands, and enhance patient safety. At this stage, with a single design selected, work is ongoing to refine ergonomics and integrate the device's electrical components.

# Arrangist: A Smart and Automatic Time Management Application

**Mariella Aletti, Sofia Morgillo, Sean Salafia, Paul Ujlaky**

Faculty Mentor: Dr. Amalia Rusu

School of Engineering and Computing

Booth: 127

*This research is affiliated with Sigma Xi*

**Abstract:**
Students frequently manage multiple competing responsibilities, including coursework, employment, and extracurricular commitments, making effective time management a persistent challenge. Existing solutions range from simple to-do lists and paper planners to complex, enterprise-level scheduling tools, yet many fail to balance usability with intelligent automation. Through competitor analysis, we identified gaps in usability, automation, and accessibility, which inform the design of Arrangist, a smart and automatic time management application. The proposed system enables users to input tasks, events, and fixed commitments, which are then automatically organized into optimized schedules based on due dates, priority levels, and estimated completion times. Leveraging natural language processing, the application allows flexible user input while ensuring schedules respect existing constraints and allocate tasks only within available free time. Iterative design and prototyping guided the development of an intuitive interface that minimizes onboarding and user effort. The primary contribution of this work lies in bridging simplicity and functionality through the integration of user-centered design and algorithmic scheduling. By dynamically adjusting schedules, the system reduces manual planning and cognitive load while promoting productivity and task initiation. Future work includes incorporating adaptive learning techniques to further personalize scheduling and improve recommendation accuracy over time.

# ADEPTRS: Adversarially Resilient Anomaly Detection for Satellite Telemetry under Evasion and Poisoning Attacks

**Jan Salafia, Sean Salafia**

Faculty Mentor: Dr. Akshay Mathur, Dr. Sidike Paheding

School of Engineering and Computing

Booth: 128

*This research is affiliated with Sigma Xi*

*This research was also presented at the NASA Connecticut Space Grant Consortium*

*This research was supported by the NASA Connecticut Space Grant Consortium*

**Abstract:**
As artificial intelligence becomes more widely used in satellite communication systems, ensuring the reliability and accuracy of data using anomaly detection models is increasingly important. This project explores how machine learning–based anomaly detection systems for satellite telemetry can be disrupted by adversarial attacks, including evasion and data poisoning, and how their robustness can be improved. Using the OPS-SAT satellite telemetry dataset, we evaluate several machine learning models under both normal and adversarial conditions. We then introduce ADEPTRS (Adversarially Resilient Anomaly Detection for Space Communications), a dual-model framework that combines a standard detection model with an adversarially trained model. A consistency gate is used to compare their outputs and identify anomalies as well as potential attacks. Results show that while traditional models experience significant drops in performance under adversarial conditions, the proposed framework improves accuracy by approximately 80% under adversarial conditions while maintaining strong detection capability. This work demonstrates a practical approach to strengthening anomaly detection systems in safety-critical environments.

# Digital Forensics of Communication-based Android Applications

**Jan Salafia, Agustin Gonzalez**

Faculty Mentor: Dr. Akshay Mathur

School of Engineering and Computing

Booth: 129

*This research is affiliated with Sigma Xi*

**Abstract:**
Mobile applications routinely process sensitive user data, and users often assume these platforms provide a higher level of privacy than is actually guaranteed. This project examines three widely used communication-based applications to evaluate how user data is stored, transmitted, and protected. Using a combination of static and dynamic analysis, we analyzed application permissions, reverse-engineered source code, and monitored runtime behavior through network traffic and system logs. Our results show that while core application data is generally transmitted securely using modern encryption protocols such as TLS, certain media files such as MP4 and JPEG content are often transmitted without encryption. This lack of protection creates an opportunity for malicious actors to intercept network traffic and reconstruct transmitted content on their own devices. Overall, the applications demonstrate largely responsible data handling practices, but still present areas where security could be improved. This project highlights the gap between user expectations of privacy and actual implementation, emphasizing the importance of thorough security analysis in mobile applications and the need for stronger protections in consumer-facing software.

# ScheduForge: Designing a Mobile Shift Scheduling Application for Hourly Workforce Environments

**John Callanan, Michael Muscara, Christopher Smith, Lin George**

Faculty Mentor: Dr. Amalia Rusu

School of Engineering and Computing

Booth: 130

*This research is affiliated with Sigma Xi*

**Abstract:**
Shift scheduling for hourly employees presents persistent operational challenges in retail, hospitality, and logistics, where existing solutions are often costly, overly complex, or poorly suited to small and mid-sized teams. Miscommunication and manual processes frequently lead to understaffed shifts, employee dissatisfaction, and unnecessary managerial burden. This project investigates the design and development of ScheduForge, a mobile and web-based scheduling application built to address gaps identified in current workforce management tools. Through a review of existing scheduling platforms, we identified recurring usability limitations and feature barriers that motivated our design decisions. ScheduForge centers on three core design principles: accessibility for non-technical users, lightweight administrative workflows, and transparent shift exchange between employees and managers. The system supports employee-driven shift posting and claiming, real-time push notifications, single-interaction managerial approvals, and an AI-assisted scheduling mode that automates shift assignments based on availability and departmental constraints. Architecturally, the application follows a three-tier model organized into four modules - User Management, Shift Management, Scheduling, and Shift Request - ensuring the system is secure, scalable, and maintainable. This project contributes a modular scheduling design and an AI-assisted shift assignment feature as a low-barrier alternative to existing tools, addressing gaps in affordability and usability. This poster presentation includes our design rationale, competitive analysis, technical prototype, and the trade-offs encountered during development. Future iterations of ScheduForge will explore predictive scheduling capabilities using historical shift data to forecast staffing needs and proactively flag coverage gaps.

# ConnectCampus: Design and Development of an AI-Supported Platform for Academic Collaboration and Student Engagement

**Brooke Kaplan, Vincenzo Baia, Erin Goodling, Poojitha Somedi**

Faculty Mentor: Dr. Amalia Rusu

School of Engineering and Computing

Booth: 131

*This research is affiliated with Sigma Xi*

**Abstract:**
ConnectCampus is a mobile application designed to enhance academic collaboration in higher education by integrating organizational tools with AI-assisted peer matching. The platform enables students to manage coursework, upload and summarize notes, and form study groups based on shared academic context, addressing common inefficiencies in student coordination and resource sharing.Our project emphasizes the design and development of a scalable and secure system architecture. A three-tier client–server model separates the user interface, application logic, and data layers, improving security, maintainability, and performance. Integration with institutional single sign-on (SSO) services ensures secure authentication and alignment with university data standards.The system is guided by four primary design objectives: improving accessibility to peer collaboration, reducing friction in study group formation, enabling structured sharing of academic materials, and maintaining a secure, scalable infrastructure. These objectives inform the platform's core functionality, including an AI-driven recommendation feature that leverages student schedules and course data to facilitate efficient peer matching.From an innovation and entrepreneurship perspective, ConnectCampus represents a scalable solution to a widely observed gap in student collaboration tools. By combining practical system design with lightweight intelligent features, our framework demonstrates potential for broader adoption across academic institutions. This project highlights how entrepreneurial thinking can be applied to identify user needs, design viable technology solutions, and lay the groundwork for future product development.

# Main(You): Bridging Productivity and Mental Wellness in Student Planning Systems

**Viktor Nikolov, Nazli Yaglidere, Austin Margiela, Ronny Cuji**

Faculty Mentor: Dr. Amalia Rusu

School of Engineering and Computing

Booth: 132

*This research is affiliated with Sigma Xi*

**Abstract:**
College students frequently rely on fragmented digital tools for task management, scheduling, and mental wellness, resulting in cognitive overload, reduced engagement, and limited support for holistic well-being. Existing platforms address isolated needs but fail to provide an integrated, student-centered experience that balances productivity with mental health support. This gap highlights a critical pain point: the absence of a unified system tailored to student workflows and emotional well-being.Main(You) is a web application designed to address these limitations by consolidating academic planning and wellness support into a single, cohesive platform. The system integrates task management, calendar scheduling, mood-based journaling, and wellness tracking within an intuitive interface. Design decisions are informed by market analysis and user pain points, prioritizing reduced context switching, personalization, and low cognitive load. The application is built using React, TypeScript, and Vite for a scalable frontend, with Tailwind CSS supporting consistent and accessible user interface design. Supabase provides backend functionality through PostgreSQL, enabling secure authentication, real-time data synchronization, and privacy-preserving data access via Row-Level Security. Core features include prioritized task organization, calendar integration, guided wellness exercises, habit tracking, and adaptive scheduling suggestions. By combining productivity and mental wellness capabilities, Main(You) demonstrates a user-centered approach to software design aligned with the complex needs of modern students. Future work will focus on incorporating machine learning–driven personalization, evaluating long-term behavioral impact, and integrating campus-specific resources to further enhance student support.

# BuildSource: An E-Commerce Solution to Materials Procurement

**Jan Salafia, Kristopher Marte, Tyler Poulin, Michael Connors**

Faculty Mentor: Dr. Amalia Rusu

School of Engineering and Computing

Booth: 133

*This research is affiliated with Sigma Xi*

**Abstract:**
Construction materials procurement remains a highly fragmented process, characterized by manual coordination, limited price transparency, and inconsistent supplier information. Existing solutions partially address these challenges but often fall short in key areas such as real-time pricing, standardized product data, and integrated supplier performance insights. Market analysis reveals persistent pain points, including inefficient supplier comparison, lack of trust in vendor reliability, and time-intensive decision-making workflows.BuildSource is designed to address these gaps through a centralized e-commerce platform tailored to the construction industry. The system integrates supplier discovery, pricing comparison, and order management within a unified interface, reducing reliance on disconnected tools. A core design contribution is the aggregation and normalization of vendor data into a standardized format, enabling direct comparison of product specifications, availability, and cost. Additionally, the platform incorporates real-time pricing and supplier performance metrics - such as delivery consistency and reliability - providing a more comprehensive and transparent basis for procurement decisions. To address gaps identified in competing platforms, BuildSource uses data-driven recommendations to match suppliers with user priorities based on historical performance, improving decision-making and reducing risks such as delays and inconsistent material quality. Future work will focus on scaling vendor participation and refining recommendation models using machine learning techniques.

# The Effects on Tissue Stress from Patches of Scarring Caused by Heart Attacks

**Ella Cosman**

Faculty Mentor: Dr. Ana Estrada

School of Engineering and Computing

Booth: 134

*This research is affiliated with Sigma Xi*

**Abstract:**
Heart attacks can produce heterogeneous patches of scar tissue, altering the mechanical stiffness of cardiac tissue. Understanding how these irregular scar patterns influence stress distribution is important for evaluating further damage to both scarred and surrounding healthy regions. This study uses FE Bio to model cardiac tissue with varying scar configurations and motion conditions, simulating both natural and abnormal heart movement. An orthotropic Fung material model was implemented, with variations in Young's modulus and stiffness tensor parameters to represent differences between healthy and scarred tissue. Stress and strain distributions were compared across models to assess the mechanical impact of patchy scarring. Preliminary results suggest that heterogeneous scar regions lead to increased stress concentrations at tissue boundaries, indicating a greater risk of mechanical strain in adjacent healthy tissue. These findings provide insight into the role of scar heterogeneity in cardiac mechanics and may contribute to improved modeling of post-infarction heart behavior.

# Exploration Into Hypoxia-Associated Genes in the Pulmonary Artery of Mus musculus

**Grace Karangekis**

Faculty Mentor: Dr. Ana Estrada

School of Engineering and Computing

Booth: 135

*This research is affiliated with Sigma Xi*

*This research was also presented at the Biomedical Engineering Society Conference (San Diego, CA); SigmaXi Northeastern Region Research Symposium and Competition (Danbury, CT)*

**Abstract:**
Mouse models are a key experimental tool for examining many biomedical abnormalities, such as the impact of hypoxia on the pulmonary artery. We were specifically interested in how hypoxia altered the genetic pathways and subsequent remodeling of the pulmonary artery in the mouse, Mus musculus. The purpose of this study was to research the interactions between 560 different hypoxia-associated genes from the pulmonary artery of Mus musculus with a primary focus on incorporating key genes, specifically Vascular Endothelial Growth Factor (Vegf) into Netflux within the MATLAB database to implement new pathways into the cell network model based on our findings from the relevant genes. While many genes contribute to altered signaling due to hypoxia in Mus musculus, the exploration into the relationship between the gene pathways of each hypoxia gene is very valuable, especially in the context of vascular growth and remodeling. With an increased focus on the way in which specific genes have been expressed in the cardiovascular system, the vascular endothelial growth factor, Vegf, emerged as particularly important for pulmonary artery remodeling. While Vegf is essential for normal vascular development, this signaling cascade has been identified as a key pathway for hypoxia-induced remodeling that should be incorporated into our cell signaling network model. Further development was investigated by exploring Vegf and other signaling pathways into computational modeling to simulate the responses of the smooth muscle cell in the pulmonary artery of Mus musculus.

# SENSITIVITY ANALYSIS OF COMPUTATIONAL CELL-SIGNALING NETWORK MODELS

**Manuel Tlachino**

Faculty Mentor: Dr. Ana Estrada

School of Engineering and Computing

Booth: 136

*This research is affiliated with Sigma Xi*

*This research was also presented at the Biomedical Engineering Society Conference 2025*

**Abstract:**
Pulmonary hypertension is a condition in which blood pressure rises in the pulmonary arteries, which is often caused by low oxygen levels or hypoxia. Hypoxia causes arteries to constrict, making it difficult for blood to flow to the lungs, which also puts strain on the heart. The computational modeling of the cell-signaling network is a useful tool in investigating and understanding the effects of hypoxia. The investigation of the sensitivity of the computational model is also important in analyzing the model's accuracy. For this research, all computational work was done using Netflux, a user-friendly computational modeling tool used to create computational models of cell-signaling networks. These models can simulate cell behaviors and allow for accessible experimentation of parameters within the cell-signaling networks, such as changing the weight of a reaction to examine different outputs. The main objective of this research was to test the sensitivity of a pulmonary artery smooth muscle cell model. More specifically, we tested the sensitivity of the model by knocking down characteristic values, as well as upregulating them. We used Netflux to export a system of ordinary differential equations into MATLAB and then wrote custom scripts to simulate knock-down and upregulation of each node in the model. We changed the weight of reactions (w) between the values of 0-1 in intervals of 0.25 and then examined how simulations varied after each trial. The variables of initial activation y0 and maximum activation ymax were also tested. We tested knockdowns by decreasing the values of ymax to values of 0 and 0.25. A difference plot was then simulated to compare the results with the results of the variable's original value of 1. We tested upregulation by increasing the value of ymax to 2 and 5, and the same process was used, in which a difference plot was simulated to compare results and analyze sensitivity. We found that changing ymax had the greatest impact on the model, so we focused on the results of these simulations. When setting the ymax variable to 0, the plots indicate that some of the species start to react, and by the colormap, we can see that the activity is on the negative side, but still different from the reactions when ymax is equal to 1. Once ymax is increased to 0,5 which is much closer to 1 than 0, the plot indicates that most of the species remain unchanged while only a handful of species have some reaction. When the variables are upregulated so that ymax is equal to 2, the similar species that reacted negatively when ymax equaled 0 now react positively. Finally, when ymax was set to 5, a larger number of

species had reactions, and most notably, ET1 and ETAR displayed the most amount of activity across all the plots. When ymax is changed to 0 and 0.25 from 1, species such as Wss show more activity. When ymax is changed to 2 and 5 from 1, species such as Stress, ET1, and ETAR display much more activity. This activity shows that computational models do react to changes in parameters, which closely simulates the behavior of the actual cell-signaling network. Therefore, computational models such as those run in Netflux are useful in investigating cell-signaling networks. The computational model reacts sensibly to changes in variable value. The next step with this research is to quantify the uncertainty of the computational model and how accurately it can simulate real cell behaviors. This will be done by simulating perturbations to the parameters using Monte Carlo simulations. An expanded version of the model will also be tested with Netflixincluding additional hypoxia signaling pathways and cell signaling models for fibroblasts and macrophages. Overall, the goal is to quantify the uncertainty that these models have when simulating cell behavior compared to how cells behave and to compare this simulated cell behavior to experimental results of cells from the pulmonary artery exposed to hypoxia.

References:

Stenmark et al., Circulation Research, 2006
Clark et al. PLOS Computational Biology, 2025
Irons et al., Annals of Biomedical Engineering, 2021

# A Modular LLM and RAG Framework for Automated Nursing Simulation Design

**Joseph Bally**

Faculty Mentor: Dr. Collin Beaudoin

School of Engineering and Computing

Booth: 137

*This research is affiliated with Sigma Xi*

**Abstract:**
The creation of unique nursing simulation labs requires a significant amount of time and resources to design. This work presents a system integrating large language models and retrieval-augmented generation models to implement an AI chatbot for automatic generation of structured nursing simulation documents. The system's framework uses fine-tuning of large language models, systematic modularization, prompt chaining, and context-aware generation to construct documents based on the current learning objective of the simulation. The chatbot's ability to adapt to particular learning objectives makes the generation of simulations highly useful to the development of nursing students in their field. It is important that these documents align with the current nursing education standards in order to ensure consistent results from the generated components. The workflow of the system is designed to minimize complexity as a barrier for the simulation generation process, allowing educators to utilize the system without needing prior training or technical knowledge of how the system works. This project shows the practicality of using task-specific AI models to reduce time expenditure, maintain standard practices, and remove unnecessary resources spent on development to instead use on impactful educational preparations.

# AI-Based Mental Health Risk Screening Using Natural Language Processing and Neural Networks

**Matthew Tully**

Faculty Mentor: Dr. Collin Beaudoin

School of Engineering and Computing

Booth: 138

*This research is affiliated with Sigma Xi*

**Abstract:**
Mental health concerns among college students have become increasingly prevalent, yet early identification of risk factors such as depression, emotional distress, and suicidal ideation has remained challenging. This project explored the development of an AI-based system for early mental health risk screening using natural language processing (NLP) techniques. By analyzing publicly available, de-identified text datasets from social media and online forums, the system aimed to detect linguistic patterns indicative of mental health struggles. The study implemented and compared both traditional machine learning classifiers and neural network models, evaluating their performance using standard metrics such as accuracy, precision, recall, and F1 score. In addition to technical evaluation, the project addressed ethical considerations, including data privacy, bias, and the limitations of AI in sensitive domains. The outcome was a fully documented prototype capable of identifying potential mental health risk from text. This work was intended strictly for educational and research purposes and did not constitute a clinical diagnostic tool.

# Design and Characterization of Graphite Piezoresistive Sensors for Hypersonic Flow Detection

**George Haithwaite, Charlotte Savigny, Molly Devine, Findley Lacey, John Cummings, Emily Alfonso-Olmos**

Faculty Mentor: Dr. David Shekhtman

School of Engineering and Computing

Booth: 139

*This research is affiliated with Sigma Xi*

**Abstract:**
Graphite sensors are sensitive to temperature, erosion, and flexing. This research focuses on the fabrication and characterization of low-cost, flexible, resistive sensors constructed from graphite deposited on paper substrates. Using a simple pencil drawing method, conductive graphite traces were formed, yielding sensors with resistance readings of 5 kΩ to 100kΩ. These sensors use the resistive properties of graphite, where resistance changes in response to mechanical deformation, temperature change, and heat-induced erosion. A Wheatstone bridge circuit was designed to detect resistance variations in the graphite sensor, improving sensitivity and enabling real-time detection of small piezoresistive changes. Experimental results demonstrate that the graphite resistors and graphite thermocouples respond measurably to flow-induced heat flux, validating their potential as lightweight and economical flow sensors. The simplicity, flexibility, and sensitivity of these devices align with emerging trends in graphite-based electronics and wearable sensing technologies. In the future, the sensors will be integrated into controlled wind tunnel environments, with an emphasis on evaluating performance under hypersonic flow conditions. The graphite-based heat flux sensors will be tested in Mach 6 flows generated by the Fairfield Ludwieg Tube to assess sensor durability, sensitivity, and response time in high-speed aerodynamic applications.

# Implementation and Testing of Quadcopter Velocity Control – Optical Flow Integration and Flight Validation

**Andrew Mejia Hernandez, Rick Daytec**

Faculty Mentor: Dr. Djedjiga Belfadel

School of Engineering and Computing

Booth: 140

*This research is affiliated with the Honors Program Thesis and Sigma Xi*

**Abstract:**
This project presents the design, implementation, and experimental validation of a horizontal velocity control system for a quadcopter using optical flow sensing. Building on prior work that established communication between the radio controller, flight controller, and onboard sensors, this study integrates an optical flow sensor to enable real-time estimation and control of horizontal motion.The system was implemented on a modified PiQuad platform equipped with an Arduino Nano 33 BLE Sense Rev 2, a Turnigy X6B receiver, and onboard sensing modules. A control algorithm was developed using principles of optical flow and inertial measurement fusion, enabling the drone to maintain a horizontal position hold and track desired velocity setpoints in Global Positioning System (GPS)- denied indoor environments.The project involved the construction of multiple identical quadcopter systems, sensor characterization testing, and implementation of the control law within the flight controller architecture. MATLAB simulations were used to validate system behavior and examine potential failure modes before experimental testing. Indoor flight tests were then conducted under controlled conditions to evaluate system performance, stability, and responsiveness.The results demonstrate that optical flow-based velocity control significantly improves horizontal stability and enables reliable position hold without reliance on GPS. This work highlights the feasibility of low-cost, sensor-based navigation for autonomous aerial systems and provides a foundation for future enhancements such as obstacle avoidance and more advanced autonomous flight capabilities.

# Using COMSOL to Compare the High Voltage Electric Field in Electrospinning for 3D-Printed Geometries

**Rebecca Chory, Phillip Sgobba**

Faculty Mentor: Dr. Isaac Macwan, Dr. Naser Haghbin

School of Engineering and Computing

Booth: 141

*This research is affiliated with Sigma Xi*

*This research was also presented at the COMSOL Conference 2025*

*This research was supported by the Hardiman Scholars Fund*

**Abstract:**
Electrospun nanofibers are widely used in tissue engineering as extracellular matrices (ECMs) due to their ability to support cell adhesion and direct cellular development. Fiber alignment plays a critical role in cellular behavior and is influenced by local electric field orientation during electrospinning. This study evaluates how scaffold material properties influence the electric field distribution and nanofiber alignment during electrospinning using COMSOL Multiphysics. The model employed the Electrostatics interface within the AC/DC Module and used a stationary study to simulate electric field behavior in an airfilled chamber. Scaffold geometries were imported from SolidWorks and grounded to a 6063-T83 aluminum collector plate. A steel nozzle (AISI 4340), located 60 mm above the collector, was assigned a 17 kV electric potential. Material properties for Formlabs' V4 Grey and Biomed White V1 resins were extracted from technical datasheets and manually applied to the models in COMSOL. A physics-controlled mesh with elements

# Strength Analysis of Polylactic acid fused with Carbon Nanoparticles Electrospun for Biomedical Materials

**Caroline Gardner**

Faculty Mentor: Dr. Isaac Macwan

School of Engineering and Computing

Booth: 142

*This research is affiliated with Sigma Xi*

*This research was also presented at the Biomedical Engineering Society Conference 2025*

**Abstract:**
Polylactic acid (PLA) is a biodegradable polymer that is innovatively becoming more frequent in biomedical applications due to its ability to be biocompatible and sustainable. When electrospun, PLA fabricates nanofibrous sheets with tunable morphologies, as well as the diameter of the fibers themselves. An electric field application, one between a nozzle extruding material at a controlled flow rate onto a metallic collector within a controlled, charged environment, produces the polymer solution containing PLA via electrospinning. Assuming protocol for executing electrospun PLA fibers into sheets that are peelable and beadless and preserve the chemical structure of PLA, the goal of this study is to experiment with the fusion of the solvent–PLA magnetically stirred into chloroform–and carbon multi-walled nanotubes to promote efficient and possibly conductive porous sheets for biomedical applications such as mitigation for bacteria, drug delivery, cell culture, etc.. The solvent was electrospun through a 20 gage needle at a flow rate of 1mL/hour, 15 cm away from an aluminum plate at a voltage of 22.5kV and with a PLA concentration of 15% weight (In trials with multi-walled carbon nanotubes, a tip sonicator is used to diffuse 1g/100mL of solvent). After spinning for an hour, we used SEM imaging to assess the fiber uniformity and diameter. Other methods of characterization are also used: A tensile tester machine (UTM) to mechanically characterize the material to establish the max strength of the material before it snaps as well as its flexibility/stiffness (assessing the slope of the stress-strain curve). A Profilometer to gauge thickness of the material. An Atomic Force Microscope (AFM) machine is intended to be used as a method of morphology assessment. Our gathered samples have been PLA sheets with fibers, free of chloroform, as well as porous and beadless. Our research continues by making minor adjustments to our established protocol, given our data from the results of previous trials. Our research goal is to produce fibrous sheets of PLA suitable for biomedical applications.

# Polylactic Acid Electrospun Nanofibers for Biomedical Application

**Alexander Hillenberg, Caroline Gardner**

Faculty Mentor: Dr. Isaac Macwan

School of Engineering and Computing

Booth: 143

*This research is affiliated with Sigma Xi*

*This research was also presented at the 2025 Annual Biomedical Engineering Society Conference*

**Abstract:**
Polylactic acid (PLA) is a biodegradable polymer that is innovatively becomingmore frequent in biomedical applications due to its ability to be biocompatible and sustainable.When electrospun, PLA fabricates nanofibrous sheets with tunable morphologies, as well as thediameter of the fibers themselves. The goal of this study is to execute and establish a standardprotocol for electrospinning PLA into sheets of peelable fibers, without beads, while preservingthe PLA's chemical structure. Our hypothesis is that PLA can be electrospun into applicablefibers by executing the correct procedure of electrospinning. We first prepared a solvent toliquidize the PLA using a 10% weight magnetically stirred in Chloroform. The chloroform itself,although not biocompatible, was not present in scanning electron microscopy (SEM) imagingand so deemed a safe and effective dispersion solvent. The met viscosity was in the range of200-400(cP). The solvent was then electrospun through a 20 gauge needle at a flow rate of1mL/hour, 15 cm away from an aluminum plate at a voltage of 20kV. After spinning for an hour,we used SEM imaging to assess the fiber uniformity and diameter. Our gathered samples havebeen PLA sheets with fibers, free of chloroform, but with the presence of beads. Our researchcontinues by making minor adjustments to our established protocol, given our data from theresults of 4 trials thus far. Our research goal is to produce beadless, fibrous sheets suitable forbiomedical scaffold application, illustrating the process/protocol of producing high-qualityapplicable PLA nanofibers.

# The Influence of 3D Printed Scaffold Shape and Material on the Alignment of Electrospun PCL Nanofibers

**Andrew London**

Faculty Mentor: Dr. Isaac Macwan, Dr. Naser Haghbin

School of Engineering and Computing

Booth: 144

*This research is affiliated with Sigma Xi*

*This research was also presented at the Material Research Society*

*This research was supported by the Hardiman Scholars Fund*

**Abstract:**
Artificially growing cells, or tissue engineering will be at the forefront of materialsresearch for years to come. Tissue engineering successfully allows for the full complexity ofanatomical structures to be recreated. This has been observed countless times, as tissueengineering involves the artificial creation of skin substitutes, cartilage repair, boneregeneration, and many more applications. Meanwhile, ongoing research continues for theconstruction of full organs, including hearts, kidneys, and livers. As this research continues toadvance, it will become lifesaving. In order to achieve this end goal there is much groundworkwhich must be laid out first. The first issue is aligning the nanofiber environments to grow cells.This is paramount to tissue engineering as aligning the nanofibers allows this environment tomimic a natural architecture of extracellular matrices (ECM) for the cells. It has been shown thatthe 3-dimensional ultrastructure of the ECM is directly related to the cell phenotype, migration,and proliferation. To achieve these environments electrospinning will be utilized. Electrospinningis an additive fabrication method that is widely used to produce very fine nanofibers from apolymer solution by applying an electric field. Electrospinning is used for many biomedicalapplications such as; drug delivery systems, wound dressing, air or water filtration, and asstated before tissue engineering. To create the alignment of the nanofiber environment manydifferent approaches have been taken. Some have taken the route of post-processing 2Delectrospun scaffolds and folded or rolled them to create 3D scaffolds to better replicate anintended alignment. Others have attempted to utilize different substrates such as aluminum foil,paper, glass slides, and polydimethylsiloxane (PDMS). However, very few have taken the routeof creating a 3D-printed scaffold to electrospin onto to influence the alignment of the nanofibers.Of the studies that have taken this approach, they are very limited to one geometry or materialof scaffolding leaving a large gap. It has been shown that the alignment of polycaprolactone(PCL) nanofibers can be influenced by a square-shaped 3D-printed scaffold. This was shownwhile using Stereolithography (SLA) printing technology on Formlabs Grey V4 Resin. The goalof this study is to investigate the influence of 3D-printed scaffold material, shapes, andelectrospinning period on the alignment of these PCL nanofibers. Three

individual scaffolds ofeach shape and material (Biomed white v1 FormLabs, v4 grey FormLabs, PCL) were created.These scaffolds have 5 different scaffold complexes each, one in each corner and one in thecenter. The scaffolds were taped to aluminum foil on the electrospinning plate. Theelectrospinning process parameters were kept constant throughout this experiment. A 15% PCLin acetone solution was dispersed utilizing a hot plate, at 45 C spinning at 750 RPMS for 15minutes then 1500 RPMS for 30 minutes. This was then checked with a viscometer to yield a cPof 180. This was then ultrasonic cleansed for 20 minutes at 50 C. The PCL mixture was thenelectrospun for 10, 20, and 30 minutes on each shape and material of scaffold. Following theelectrospinning process the scaffolds will be analyzed using scanning electron microscopy(SEM). This will emit a beam of electrons and focus them on the scaffold, giving a precise imageof the PCL nanofibers by separating the color of the elements by atomic number. This will give aprecise image at a distance scale of 30 microns, 10 microns, and 2 microns. Each of these 3distances will have images taken in 5 places on each window of the scaffold; the North, South,East, West, and center. To measure the PCL nanofibers; fiber diameters, pore sizes, andalignment, ImageJ software will be utilized.

# Stepping Into Refugee Realities: Predictors of Impact in experiential learning

**Jordan Sherman, Catherine Steele**

Faculty Mentor: Dr. Mallika Arachchilage Danushka S. Bandara, Julie Mughal, Sabnam Gosh (Washington University)

School of Engineering and Computing

Booth: 145

*This research is affiliated with Sigma Xi, and the Center for Social Impact*

**Abstract:**
The “Walk a Mile in My Shoes” event is a hands-on simulation designed by Jesuit Refugee Services in which participants assume the role of a refugee and act out a day at Dadaab refugee camp in Kenya. Participants begin with an identity card that explains their circumstances as they are guided through registration, food services, shelter, and other stations detailing the challenges of living in a refugee camp. The simulation is designed to give people an idea of the hardships and emotions experienced by refugees.Participants were students, faculty and staff from Fairfield University who took part in the Walk a Mile in My Shoes experience. A total of 35 participants completed the survey, the analyses focus on respondents with complete data (N = 27). Using the Spearman’s rank correlation we found a hierarchy of predictors when it comes to influence, we found that respondents who felt more engaged during the event were much more likely to rate the outcome as Extremely Impactful ($\boldsymbol{\rho}$=0.72, p

# Observing Adversarial Behavior Through a Minimalist Web Honeypot: A Four-Month Study Using NetCat on Ports 80 and 443

**Johan Lantigua, Trinity Santiago, Marissa Shanley**

Faculty Mentor: Dr. Mirco Speretta

School of Engineering and Computing

Booth: 146

*This research is affiliated with Sigma Xi*

*This research was also presented at the CEN CONNECT - CEN 2026 Annual Member Conference*

**Abstract:**
This poster presents the design, deployment, and empirical analysis of a lightweight honeypot implemented using NetCat to emulate a web server offering HTTP and HTTPS services on ports 80 and 443. Over a continuous four-month monitoring period, the honeypot was exposed to the public Internet to observe unsolicited interactions and adversarial behavior under realistic conditions.We analyze the time-to-discovery of the honeypot, characterize the progression from initial reconnaissance to active exploitation attempts, and classify the types of attacks observed. Collected data includes scanning activity, malformed requests, protocol misuse, brute-force attempts, and probes targeting common web and TLS-related vulnerabilities. Particular attention is given to attack patterns that reveal adversary tooling and server-side technologies.The study highlights how even a minimal, low-interaction honeypot can yield high-value insights into attacker behavior and prevalent exploitation techniques targeting web-facing services. We conclude by discussing the implications of these observations for defensive monitoring and the use of simple deception mechanisms as an effective component of cybersecurity research and operational security.

# A Three Session Robotics Module with the Dobot Magician in a First Year Engineering Course and Its Bridge to Arduino

**Evelyn Faber**

Faculty Mentor: Dr. Naser Haghbin

School of Engineering and Computing

Booth: 147

*This research is affiliated with Sigma Xi*

*This research was also presented at the American Society of Engineering Education*

**Abstract:**
This paper describes the design and initial delivery of a three-session robotics module using the Dobot Magician in a first year engineering course and its intended bridge to a subsequent Arduino unit. The module was designed as a fully scaffolded sequence that required no prior robotics or programming experience. Instruction began with Teaching and Playback in DobotLab to introduce fundamental robot motion and safe operation, including homing, workspace awareness, and safe height practices. Students then transitioned to Blockly, where these same motion concepts were reinforced through a guided pick-and-place task. Finally, students used the Python panel to run and make small, supported modifications to provided code, building directly on the logic and motion patterns established in the earlier sessions. A course embedded evaluation used pre- and post- surveys administered before the robotics sequence and after completion of the Arduino unit. The pre -survey included 19 responses and the post survey included 18 responses, with unpaired analyses because responses were not matched across time points. Five shared constructs assessed task sequencing, familiarity with Arduino sensing and conditional logic, robotics safety and operation, confidence in learning Python, and interest in automation and mechatronics. Post only items assessed perceived bridge to Arduino, relevance to engineering practice, perceived troubleshooting growth, and fault recovery confidence, complemented by open ended feedback. Post survey results showed the largest improvements for Arduino sensing and conditional logic, with percent agree increasing from 5.3 to 61.1, and for robotics safety and operation, with percent agree increasing from 10.5 to 55.6. Interest in automation, controls, and mechatronics remained high and stable from pre to post, with a median of 4.0 at both timepoints, and percent agree of 84.2 pre and 83.3 post. Post only results indicated high perceived relevance to engineering practice, with a median of 4.5 and percent agree of 94.4, and moderate perceptions of the robotics to Arduino bridge, with a median of 4.0 and percent agree of 61.1. In contrast, fault recovery confidence was lower and more variable, with a median of 3.0 and percent agree of 33.3, indicating a need for additional structured practice in alarm clearing and recovery steps in future iterations. Prior robotics experience was not captured in the pilot surveys, and future offerings will include a brief background item to examine whether perceived value and confidence gains differ by experience level.

# Enhancing Campus Exploration with AI-Driven Jackal UGV for 3D SLAM Mapping and Human-Robot Interaction

**William Ehlers**

Faculty Mentor: Dr. Sidike Paheding

School of Engineering and Computing

Booth: 148

*This research is affiliated with Sigma Xi*

*This research was also presented at the University of Bridgeport (last year)*

**Abstract:**
Universities are increasingly seeking innovative technologies to create interactive and informative experiences for students, staff, and visitors. In response to this need, we developed a robotic system using Clearpath's Jackal Unmanned Ground Vehicle (UGV) to generate a campus-wide 3D point cloud map through Simultaneous Localization and Mapping (SLAM). Our system combines LiDAR and a FLIR camera with YOLO11 object detection to provide a comprehensive spatial understanding of the environment. In addition to enhancing research in autonomous navigation, the project is designed to support human-robot interaction, making it adaptable for campus tours and other admissions-related functions.Our platform integrates voice interaction capabilities to allow users to control the robot via natural language commands. For example, users will be able to issue a command such as “Move forward two feet,” to which the robot will provide confirmation and execute the task. The system leverages Python-based control scripts, running on a Linux laptop connected to the robot via SSH, to manage movement, object detection, and environmental feedback. A bash script automates the setup and connection process to streamline deployment.The robot captures real-time data through multiple sensors, creating a highly detailed point cloud map of the campus. This data is intended to enhance future autonomous navigation and dynamic obstacle avoidance features, while also improving human-robot interaction capabilities through conversational feedback. By developing a robotic platform that combines SLAM, object detection, and conversational AI, our project offers a novel approach to both campus mapping and educational technology research.Our implementation's unique contribution lies in its ability to merge AI-powered interaction with environmental mapping, thereby bridging human communication and advanced robotics. The system has the potential to transform not only campus navigation for visitors but also research opportunities for students in robotics and AI. Future applications may include dynamic navigation with real-time path planning, further enhancing both the admissions experience and broader campus operations.

# Underwater Image Enhancement Using Deep Learning

**Ryan Woodzell**

Faculty Mentor: Dr. Sidike Paheding

School of Engineering and Computing

Booth: 149

*This research is affiliated with Sigma Xi, and Climate, Coastal and Marine Studies*

**Abstract:**
Underwater environments severely degrade image quality due to light scattering, absorption, and suspended particles, resulting in blurred details, color distortion, and reduced visibility. These issues hinder accurate visual interpretation for marine research, biology, and underwater robotics. This project presents an enhancement system based on a U-Net architecture with two key innovations: an attention mechanism that identifies and prioritizes the most degraded image regions, and a custom learnable layer that adapts to the complex intensity distortions characteristic of underwater imagery. Experimental results demonstrate strong performance on specialized underwater quality metrics (UIQM and UICQU), showing substantial improvements in visual clarity, color fidelity, and overall image quality compared to standard approaches.

# Ultrasound-Guided Cricothyrotomy Trainer

**Mitrophan Ganson**

Faculty Mentor: Dr. Susan Freudzon

School of Engineering and Computing

Booth: 150

*This research is affiliated with Sigma Xi*

*This research was also presented at the Northeast Bioengineering Conference*

*This research was supported by the Hardiman Scholars Fund*

**Abstract:**
Cricothyrotomy is a medical intervention used to establish and secure an airway, performed as a last resort when other methods are unsuccessful. The procedure requires a trained medical professional to make an incision through the cricothyroid membrane and insert a tube into the trachea to establish the airway. Locating the cricothyroid membrane is typically done by palpation; however, it has been found that using ultrasound is far more accurate. Studies found that the success rate of palpation was only 70%, with rates as low as 39% for obese patients. [1] In contrast, ultrasound-guided cricothyrotomy allows for direct visualization of the cricothyroid membrane, thyroid, and cricoid cartilagewhich improves the cricothyrotomy success rate. Most current artificial training models cost thousands of dollars and are not ultrasound compatible. This study aimed to design and create an ultrasound-compatible cricothyrotomy training model, integrating a 3D–printed trachea replica and silicone matrix. A neck-shaped mold was designed in SolidWorks and 3D printed with polyactic acid (PLA) filament. A previously developed 3D-printed trachea (Airway Collaboration) was wrapped in Tegaderm and incorporated into the model to provide anatomically correct internal airway structure. A custom wire scaffold was designed and built to ensure anatomical accuracy and tracheal positioning within the mold during silicone casting. A 10A hardness silicone mix was used for the model. The model prototype was evaluated with ultrasound equipment by an anesthesiologist at Yale New Haven Hospital using an Acuson P300 ultrasound system. The silicone model demonstrated compatibility with ultrasound imaging upon an investigation in the clinical setting.

# Computational Modeling of Hypoxia in Vascular and Pulmonary Artery Smooth Muscle Cells

**Erin Gibbons**

Faculty Mentor: Dr.Ana Estrada

School of Engineering and Computing

Booth: 151

*This research is affiliated with the Honors Program Thesis and Sigma Xi*

*This research was also presented at the Biomedical Engineering Society 2025; Netflux Computational Biology Conference; upcoming Sigma Xi Conference*

**Abstract:**
Pulmonary artery growth and remodeling is driven by excessive proliferation of smooth muscle cells. Vascular smooth muscle cells (VSMCs) in the pulmonary artery wall and pulmonary artery smooth muscle cells (PASMCs) control the diameter of the pulmonary artery consequently changing the pulmonary vascular resistance (PVR). A high PVR indicates pulmonary hypertension: a condition where blood pressure rises in the pulmonary arteries, often due to hypoxia. Hypoxia causes arteries to thicken and narrow, making it difficult for blood to flow to the lungs while also putting a strain on the heart. This condition also leads to an increased level of certain peptide hormones and proteins. A complex VSMC network model is used to investigate the effects of hypoxia on vascular remodeling by adding new pathways and simulating different perturbations: increased angiotensin II, stress, Notch, PRR, FAT atypical cadherin 1 (FAT1), IL-R and PINK1/Parkin. With this framework, we further demonstrated the role of hypoxia on vascular remodeling by incorporating new species to better simulate hypoxia and further analyze the effects of increased peptide hormones and proteins.

# Ergonomic Gloves for Individuals with Arthritis

**Erin Gibbons**

Faculty Mentor: Dr.Susan Freudzon

School of Engineering and Computing

Booth: 152

*This research is affiliated with Sigma Xi*

**Abstract:**
According to the World Health Organization, roughly 528 million people worldwide have osteoarthritis, the most common type of arthritis (WHO, 2023). Arthritis makes it difficult for individuals to perform basic tasks due to joint stiffness and pain. The goal of this project is to design an ergonomic assistive glove for individuals with arthritis. As part of this project, design specifications, ethical considerations, CAD models, and material selections were developed with the aim of producing a prototype for an ergonomic glove. The proposed device is intended to improve users quality of life by helping them pick up objects and enhancing their ability to perform daily tasks.

# GenAI Under Attack: Evaluating Enterprise Security Gaps Against Emerging AI Threat Vectors

**Ronald Bradford, Michael Goger, Amir Alibali**

Faculty Mentor: Dr. Charles P Shelley

School of Engineering and Computing

Booth: 153

*This research is affiliated with Sigma Xi*

**Abstract:**
The integration of generative AI (GenAI) has introduced new attack vectors that existingcybersecurity frameworks were not designed to adequately address. This project draws onGenAI vulnerability reports from 2022–2025 and early 2026, cross-referenced against OWASPLLM Top 10 and MITRE ATLAS classifications, to evaluate which attack vectors current securitycontrols leave most exposed and what mitigation strategies most effectively close that gap.The OWASP LLM Top 10 provides GenAI application-layer risk classifications, while MITRE ATLASmaps adversarial tactics and techniques specific to AI and ML systems. The rapid maturation ofMITRE ATLAS, from 36 techniques across 12 tactics in 2021 to 97 techniques across 16 tacticsby March 2026, reflects the accelerating pace at which the AI attack surface is being formallydocumented.The defensive tooling ecosystem has matured considerably since 2022, producing purpose-builtsolutions across pre-deployment evaluation, adversarial red teaming, input filtering, outputvalidation, and continuous monitoring. Pre-deployment adversarial red teaming emerges as thehighest-leverage intervention, addressing attack vectors that neither static code analysis norruntime monitoring can detect. However, no single tool provides adequate protection. Trainingdata poisoning remains underserved, multimodal attack vectors are outpacing text-only inputdefenses, and the architectural root cause of prompt injection between instructions and datacannot be addressed by any currently available tool.Attack vector priorities are constantly evolving. While prompt injection, model inversion, anddata poisoning defined the 2024 - 2025 threat landscape, the current threat surface as of early2026 has shifted toward LLM jailbreaking, which overlaps substantially with prompt injection,and the rapidly maturing attack surface introduced by Model Context Protocol (MCP)integrations. This research finds that as AI becomes embedded in critical systems, an accurateand current taxonomy of attack vectors is foundational to effective cybersecurity posture.

# Implementing Phishing-Resistant MFA with Device Compliance at an Ivy League Institution

**Alessandra Toscano**

Faculty Mentor: Dr. Charles P Shelley

School of Engineering and Computing

Booth: 154

*This research is affiliated with Sigma Xi*

**Abstract:**
This project implements phishing-resistant multi-factor authentication (MFA) alongside device compliance checks at an Ivy League institution to reduce credential-based attacks. Traditional MFA methods, such as SMS and push notifications, are susceptible to phishing and social engineering, prompting the adoption of stronger methods like YubiKeys and mobile passkeys.This project enforces a layered security model in which users must authenticate with phishing-resistant methods from devices that meet defined security requirements. The rollout was conducted in phases, beginning with higher-risk departments, and completed with minimal disruption despite some challenges. Early results show no account compromises among initial users, highlighting the effectiveness of combining phishing-resistant MFA with device compliance controls.

# Model Threat Hunt Build-Out

**Maureen VonHassel, Theodore Awa, Matthew Donohue**

Faculty Mentor: Dr. Charles P Shelley

School of Engineering and Computing

Booth: 155

*This research is affiliated with Sigma Xi*

**Abstract:**
Threat hunting transforms cybersecurity from a reactive process to a proactive, intelligence-driven discipline. As organizations face increasingly sophisticated adversaries, threat hunting has evolved from an ad hoc activity into a structured and repeatable methodology designed to identify threats that evade traditional security controls. This project presents the design and implementation of a model threat hunting structured to operate in a modern Security Operations Center (SOC) for a mid-to-large online retail organization with more than 10,000 employees. The team consists of four specialized roles: threat hunter, intel analyst, automation engineer and detection engineer. Each role contributes distinct expertise to support a collaborative and continuous threat hunting process. The team leverages a range of tools to assist in hunting including Security Information and Event Management (SIEM), alert dashboards, automation frameworks, scripting, and open-source and commercial intelligence sources to conduct comprehensive investigations. Operations are guided by a seven-step threat hunt cycle designed to standardize and streamline hunting activities. This cycle incorporates intelligence preparation, data collection, hypothesis development, active investigation, documentation, and automation of findings to enhance future decisions. The effectiveness of this model was evaluated through the development and execution of a detailed runbook focused on Adversary in The Middle (AiTM) credential threat attacks. This scenario demonstrated how structured collaboration and role specialization enable a threat hunting team to rapidly detect, analyse and mitigate advanced threats.The results of this project illustrate how a formalized threat hunting framework can improve organizational security posture, reduce attacker swell time, and promote continuous improvement within SOC operations.

# An AI-Assisted Decision-Support System for Application Technology Risk Assessment in Banking

**Joe Wilson, Tolulope Omole, Neil Sanyal**

Faculty Mentor: Dr. Charles P Shelley

School of Engineering and Computing

Booth: 156

*This research is affiliated with Sigma Xi*

**Abstract:**
Financial institutions face increasing challenges in maintaining consistent, regulation-aligned security assessments across large technology portfolios. Non-technical Service Owners at Liberty Trust Bank must complete a 60-question Application Technology Risk Assessment (ATRA) for each of the bank's more than 2,000 applications annually. Many questions involve technical security concepts governed by NIST 800-53, FFIEC guidance, and the Gramm-Leach-Bliley Act. These frameworks can fall outside the expertise of the business stakeholders responsible for answering them. This knowledge gap can produce inconsistent and incomplete assessments that introduce measurable compliance risk.This project designed and evaluated an AI-powered chatbot to address that gap directly. The system employs a Retrieval-Augmented Generation (RAG) architecture, pairing a large language model with a searchable knowledge base of internal bank policies and federal regulatory documents. When a Service Owner encounters an unfamiliar ATRA question, the application retrieves relevant policy context and delivers plain-language, citation-backed guidance. This bridges the distance between regulatory requirements and the non-technical users responsible for meeting them. The architecture’s deployment was determined through a structured risk evaluation against the NIST AI Risk Management Framework 1.0. Analysis across its four core functions of Govern, Map, Measure, and Manage established that routing ATRA data through external cloud-based providers would conflict with GLBA data protection obligations and FFIEC third-party risk requirements. A locally hosted, network-isolated implementation was identified as the compliant and auditable solution. This keeps all system activity within the bank's internal infrastructure and fully available for regulatory examination.

# Multi-Modal UAV Obstacle Detection and Avoidance Using LiDAR, Vision, and Companion Computing with ArduPilot

**Joseph Borges, Lucas Morello**

Faculty Mentor: Dr. Djedjiga Belfadel

School of Engineering and Computing

Booth: 157

*This research is affiliated with Sigma Xi*

*This research was supported by the Albert M. Loch Fund*

**Abstract:**
Unmanned Aerial Vehicles (UAVs) require reliable, real-time obstacle detection and avoidance to operate safely in complex, dynamic environments. Traditional LiDAR-based systems provide accurate distance measurements but lack semantic understanding, while vision-based approaches offer object recognition capabilities but can be computationally intensive and sensitive to environmental conditions. This work presents the design and implementation of a hybrid obstacle detection and avoidance system that integrates LiDAR and vision-based sensing using a companion computing architecture.The proposed system utilizes an NVIDIA Jetson Orin Nano, which performs onboard machine-learning inference for object detection and depth estimation. The system processes and fuses sensor data on the Jetson and transmits avoidance commands to the flight controller running open-source ArduPilot firmware. The flight controller executes real-time navigation adjustments while maintaining flight stability. The UAV prototype is built on a quadrotor platform and integrates a Pixhawk flight controller running ArduPilot, powered by a LiPo battery. The sensing suite includes 360° LiDAR for environmental mapping, a time-of-flight (ToF) sensor for short-range ground distancing and landing stability, and a 4K monocular camera for vision-based processing. An analog FPV camera system with a custom on-screen display (OSD) provides real-time telemetry and pilot feedback, supporting layered situational awareness for both autonomous operation and manual flight.Simulation-in-the-loop (SITL) testing in Gazebo is used to validate control integration before hardware deployment, followed by experimental flight testing to evaluate the system. The system architecture enables efficient division of computation, leveraging the Jetson for perception and the flight controller for control execution. In parallel, lightweight deep learning models for vision-based object detection and depth estimation were deployed on the Jetson platform within a simulation environment to evaluate their feasibility for real-time UAV perception.Preliminary results demonstrate the successful integration of LiDAR-based perception with ArduPilot and the feasibility of real-time onboard processing for UAV autonomy. Additionally, the evaluation of lightweight vision models highlights the potential to incorporate machine-learning-based semantic understanding into the system. This work presents a practical framework for multimodal perception on resource-

constrained UAV platforms and highlights the advantages of companion-computer architectures in advancing autonomous navigation.

# Electrical Characterization of Polymer Nanocomposites for Supercapacitor Electrodes

**Ugo Anamege**

Faculty Mentor: Dr. Isaac Macwan

School of Engineering and Computing

Booth: 158

*This research is affiliated with Sigma Xi*

*This research was also presented at the American Chemical Society Conference*

*This research was supported by the Hardiman Scholars Fund*

**Abstract:**
Polymer nanocomposites were fabricated using electrospinning and electropolymerization, and characterized for potential use as supercapacitor electrode materials. Nine different composites were prepared: polyvinyl alcohol (PVA), PVA with magnetite ($Fe_3O_4$), PVA with brominated compounds (BR), polycaprolactone (PCL), PVA with multi-walled carbon nanotubes (MWNT), PVA with single-walled carbon nanotubes (SWNT), PVA with MWNT and BR, PVA with graphene, and PVA with graphene oxide (GO). Electrical conductivity was measured using both two-probe and four-probe methods across a voltage range from 0 to 15 volts. DC measurements showed open-circuit behavior, indicating that the device primarily exhibits capacitive, rather than resistive, properties. Conductivity readings were either falsely high or inconsistent, most likely because the materials could not conduct DC current. However, this capacitive behavior suggests that these materials could be well-suited for supercapacitor applications. Further investigation using impedance spectroscopy is needed.

# Electrochemical Behaviors & Morphological Characterization of Polypyrrole-Graphene Based Nanocomposites

**Pirnaaz Mekael**

Faculty Mentor: Dr. Isaac Macwan

School of Engineering and Computing

Booth: 159

*This research is affiliated with Sigma Xi*

*This research was also presented at the Materials Research Society*

**Abstract:**
Polypyrrole (PPy) is a conductive polymer widely used in biosensors and electrochemical devices due to its favorable electrical and biocompatible properties. Incorporating carbon-based nanoparticles such as graphene can further enhance film conductivity, mechanical stability, and surface area. In this study, cyclic voltammetry (CV) parameters were optimized to synthesize stable PPy and PPy-graphene composite films for potential use as scaffolds in bacteriorhodopsin (BR)-based optical-electrical biosensing systems. PPy was electropolymerized onto a carbon plate using cyclic voltammetry as 0.1 V/s over a range of -0.2 to 1.02 V for 100 cycles in 0.1 Na2SO4. Using the same optimized conditions, graphene was co-deposited onto the PPy film to create composite layers. Surface morphology and film formation were evaluated using scanning electron microscopy (SEM), while electrochemical impedance spectroscopy (EIS) was used to assess electrical performance. SEM imaging revealed the characteristic cauliflower-like morphology of pure PPy and layered structures in the PPy-graphene composites, indicating the increased surface complexity. EIS results demonstrated reduced impedance and improved charge transfer in composite films. These findings indicate that optimized PPy and PPy-graphene scaffolds exhibit structural and electrochemical properties suitable for future BR incorporation, supporting their potential application in light-driven biosensing.

# Nanofibrous Electrospun Scaffolds to Characterize the Interactions Between 2D Carbon Nanoparticles and Bacteriorhodopsin Embedded within the Purple Membrane

**Amber Santorelli**

Faculty Mentor: Dr. Isaac Macwan

School of Engineering and Computing

Booth: 160

*This research is affiliated with Sigma Xi*

*This research was also presented at the Material Research Society*

*This research was supported by the Hardiman Scholars Fund*

**Abstract:**
Bacteriorhodopsin (BR) is a photosynthetic protein of archaeon Halobacterium salinarum that contains the chromophore retinal. This chromophore can absorb light, thereby triggering a conformational change within the protein BR and converting the energy of light into an electrochemical protein gradient, thus pumping hydrogen ions (protons) across the membrane. BR undergoes a photocycle when a photon of light strikes it which causes it to undergo a conformational change from all trans structure to the 13-cis structure. The Q state of BR is the most stable and has a lifetime of 7-12 year. BR is used in the fields of biomedical engineering and bio-nanotechnology specifically targeting applications in three-dimensional optical memory devices, protein- based retina implants, real-time holographic media, and engineered photovoltaic cells. Poly-vinyl alcohol (PVA) is a hydrophilic polymer that is commonly used in the pharmaceutical industry to coat tablets and capsules. PVA has strong adhesion properties making it an excellent choice for a matrix when characterizing 2D carbon nanoparticles. A 2D nanomaterial is a material that has 2 dimensions outside the nanoscale and only 1 dimension with 1 thickness or a few atomic layers. Graphene (G) is considered a 2D carbon nanoparticle consisting of a single layer of carbon atoms arranged in a hexagonal lattice with great mechanical, electronic and thermal properties. Graphene oxide (GO), a precursor of graphene, has similar sheets but contains oxygen based functional groups such hydroxyls, carboxyls, carbonyls and epoxides. G and GO contain negative charges due to the presence of different chemical functional groups which allow for the deposit of different substrates onto their sheets. BR, a positively charged protein, can form non-covalent hydrogen bonds with the chemical functional groups of G and GO and be adsorbed onto their sheets. The technique of electrospinning synthesizes scaffolds of the nanocomposites PVA and PVA-GO to generate nanofibrous structures that mimic natural tissue and detect the presence of BR to characterize its photostates. Synthesized polymeric scaffolds are beneficial in the disciplines of tissue

engineering, drug delivery and biomedical devices. Different sets of dispersion were created of PVA and PVA-GO and then purified using hot plate heating and QSonica Sonicator tip sonication. The viscosity of each dispersion was tested using a viscometer. The technique of electrospinning, technology that uses an electrical field to synthesize nanofibers from a polymer solution will be used to generate scaffolds of each dispersion set. The synthesized scaffolds will then be characterized using the techniques of scanning electron microscope (SEM), energy dispersive x-ray (EDAX), atomic force microscope (AFM) and profilometer to analyze the interaction between BR and 2D nanoparticles. Nanofiber diameter was analyzed using OrientationJ within ImageJ. Statistical analysis was performed on the gathered data using OriginPro. Statistical tests were performed on the different diameters, carbon oxygen ratios and scaffold thickness using two-sample T-tests to determine the differences in the means and the variances. Furthermore, Shapiro Wilks tests were performed to determine normal distributions. It is anticipated that through the adsorption of BR on to graphene oxide, the resulting substrate has a potential to preserve the yield of BR in the Q-photostate and be effective in the application of biomedical devices.

# Application of Polyvinyl Alcohol (PVA) and Magnetite composition scaffold in Biomedical engineering

**Adarsh Subramanya Sai**

Faculty Mentor: Dr. Isaac Macwan

School of Engineering and Computing

Booth: 161

*This research is affiliated with Sigma Xi*

*This research was also presented at the American Chemical Society spring 2026*

**Abstract:**
Electrospun nanofibrous scaffolds have emerged as promising biomaterials due to their structuralsimilarity to the extracellular matrix (ECM), high surface-to-volume ratio, and tunable physicochemicalproperties. Among various polymer–nanoparticle hybrid systems, polyvinyl alcohol (PVA) combined withmagnetite ($Fe_3O_4$) nanoparticles represents a versatile platform for biomedical applications, owing to thebiocompatibility, hydrophilicity, and processability of PVA, along with the unique magnetic, mechanical, andfunctional properties imparted by magnetite. This work investigates the development, characterization, andpotential applications of PVA–magnetite electrospun nanofibrous scaffolds tailored for tissue engineering, drugdelivery, and bio-sensing. 0.25 wt% magnetite is first dispersed in deionized water using tip sonication for twohours followed by addition of 11 wt% PVA and additional 30 minutes of tip sonication. Electrospinning isemployed to fabricate uniform nanofibers, with process parameters optimized to achieve smooth, bead-freemorphologies and controllable fiber diameters. The incorporation of magnetite nanoparticles into the polymermatrix was verified through SEM and EDX (energy dispersive x-ray) analysis, confirming successful dispersionwithout significant agglomeration. SEM analysis also revealed homogeneous fiber networks, while mechanicaltesting demonstrated enhanced tensile strength and elasticity compared to pristine PVA fibers, highlighting thereinforcement effect of magnetite. Furthermore, magnetite incorporation modulated hydrophilicity and porosity,key factors influencing cell adhesion and nutrient transport. Magnetic properties are verified using gaussmeter,enabling the scaffolds to respond to external magnetic fields. This functionality opens opportunities for remote-controlled drug release, magnetically guided cell alignment, and hyperthermia-assisted therapies. In vitro, suchscaffolds are also anticipated to be used for favorable cell adhesion, proliferation, and viability to provide asupportive microenvironment for tissue regeneration. Overall, PVA–magnetite scaffolds present amultifunctional platform bridging structural support with magnetically tunable functionalities. Their combinedadvantages—biocompatibility, mechanical robustness, and external field responsiveness—position them asstrong candidates for diverse biomedical engineering applications.

# A Review of the Application of a Sports Science Shared-Interest Framework for Broad-based STEM Outreach

**Joseph Duszak**

Faculty Mentor: Dr. John Drazan

School of Engineering and Computing

Booth: 162

*This research is affiliated with Sigma Xi*

*This research was also presented at the Biomedical Engineering Society Annual Meeting 2025*

*This research was supported by the Albert M. Loch Fund*

**Abstract:**
There is growing evidence that informal STEM outreach programs centered around traditional STEM topics, such as robotics clubs, appeal to a population of youth that have a pre-existing STEM interest. As such, traditional STEM outreach is limited in its scope, preferentially engaging a small population of pre-interested youth that leads to a missed opportunity to broaden participation in informal STEM activities. We propose a new model of STEM outreach to broaden participation in informal STEM programming to engage students without a pre-existing interest in STEM. We developed the Area of Shared Interest (ASI) framework to ameliorate this gap by providing an alternative model to STEM outreach programming. Our ASI framework is centered on activities where there is a shared identity and interest between the STEM practitioner and the community, within which STEM concepts can be authentically deployed to improve and inform practice. We have developed an ASI proof of concept within sports, specifically basketball. As such the goal of this project is to 1) Demonstrate that the ASI framework within sports can engage new populations of youth, and 2) Evaluate whether our sports ASI is effective in increasing STEM interest through sports. To gauge the effectiveness of this model, we will be reviewing a collection of outreach events conducted between the years 2017-2024 that implemented the ASI sports science combine framework. The objective of these events was to gauge the perception of STEM among students with little to no pre-existing interest to determine if ASI STEM outreach was effective in appealing to a new population of youth. The way this was accomplished was through the use of pre- and post-event Likert-type surveys that have questions pertaining to perceptions of sports, of STEM, namely in terms of what the participant thinks science is, who does science, and where science is done, and how prevalent they believe STEM to be in their everyday lives and sports activities. The results of these surveys will be compared to one another to measure the change, if any, of the perception of STEM from before and after completing the combine activity.A total of four deployments in the framework were reviewed. Among recorded deployments encompassing 3,174 participants, the ASI framework has consistently shown to increase STEM interest among participants with little to no pre-existing interest through the use of the sports

science combine.However, these results should not encourage researchers to pursue sports science outreach as a means to broaden potential future practitioners. Instead, practitioners should work within their own interests with members of communities they hope to benefit to create events that connect STEM concepts to an activity they already participate in and enjoy outside of the context of their work.

# A Systematic Review of Objective Quantification of Subjective Measures of Presence in Virtual Environments

**Joseph Duszak**

Faculty Mentor: Dr. John Drazan, Dr. Danushka Bandara

School of Engineering and Computing

Booth: 163

*This research is affiliated with Sigma Xi*

*This research was also presented at the Biomedical Engineering Society Annual Meeting 2025*

*This research was supported by the Albert M. Loch Fund*

**Abstract:**
Presence, often described as the feeling of "being there" in virtual environments, is difficult to objectively evaluate across experiences and equipment. Presence in virtual reality has been attributed to increased simulation outcomes, and can allow researchers to ask and answer questions that they may not have been able to in normal, non-virtual environments. Presence is typically assessed by researchers via subjective measures, such as questionnaires or surveys; however, physiological measurements, such as EEG, EDA, and HRV, and task-based measurements, such as evaluated performance, have significant potential to provide objective measurements of presence. Due to the subjective nature of presence, it is important to try to quantify the results of self-reported surveys and questionnaires to introduce a degree of reproducibility, and so researchers can further validate the work they do in virtual environments. However, there is a gap in the literature concerning how subjective measures of presence may be quantified using objective metrics.A literature search conducted following PRISMA guidelines was conducted to determine how, if at all, researchers are using objective metrics to quantify the self-reported measures of presence they obtain in their experiments. The search was conducted using the Science Direct database, and the keywords "Presence" and "Virtual Environment" were used, with these terms needing to appear in the title, abstract, or keywords of collected articles. Science Direct was selected for this search due to its multidisciplinary library of journals related to our research question, and the large collection of open access articles. The search was conducted from May 27th to June 16th, 2025.A total of 555 articles of interest were reviewed, with 534 sources collected from the database search, with an additional 21 sources collected from Alamirah et al. (2022), a review paper that was deemed relevant, with only 41 articles fitting in the accepted review criteria. Of the 41 articles, 31 used physiologically-based measurements to quantify presence, 8 used task-based measurements, and 2 used both. Physiological-based measurements involved using EEGs, EDAs, and/or ECGs, but also included startle response, body movement, and eye tracking. Task-based measurements involved task completion, task performance, and memory performance. The results of this search were consistent with trends

within the literature; EEGs remain as one of the most consistent modalities of measuring presence, while EDA and ECG measurements have both been consistent and inconsistent. Additionally, there is a lack of understanding in the literature surrounding how task-based measurement may be used to quantify subjective measures of presence.More research is needed to better understand what the best practices for quantifying presence objectively are. Understanding how presence is measured in a virtual environment is important, as both subjective and objective measurements can provide researchers with valuable information about how individuals interact with the world (or rather worlds) around them. As such, determining how to best record feelings of presence can allow researchers to ask and answer questions they may not have been able to in a normal environment, and can allow for a deeper understanding into the body's autonomic response to virtual stimuli. Researchers should continue to use their best judgement in determining what the best method of collecting data for their experiments should be, but may want to consider how they can further increase the confidence and reproducibility in the work they are putting forward.

# Event Detection and Classification of On-Court Achilles Tendon Loading Using Machine Learning

**Matthew Manduca**

Faculty Mentor: Dr. John Drazan

School of Engineering and Computing

Booth: 164

*This research is affiliated with Sigma Xi*

**Abstract:**
The Achilles tendon (AT) is the strongest tendon in the human body; however, it is particularly susceptible to rupture (ATR). Typically, AT loading patterns are studied in the laboratory, with subjects completing constrained movement under controlled conditions. These measurements may not provide a complete approximation of natural AT loading patterns withstood during physical activity. The emergence of wearable sensors has enabled the collection of ground reaction force (GRF) data outside of the lab, providing new opportunities to evaluate AT loading during sport-specific movements. However, limitations in manual processing techniques remain prevalent, hindering the development of meaningful analytical methods. This study proposes a machine learning pipeline to enable high-throughput detection and classification of movement events from on-court GRF data. Using an existing dataset collected with instrumented insoles during basketball drills, a comprehensive processing pipeline was developed to segment individual steps, extract biomechanically relevant features, and assign movement labels from synchronized video data. Supervised machine learning models were then trained to classify each step into discrete movement categories, enabling future analysis of movement patterns within each category. By combining wearable sensor data with machine learning classification, this approach provides a foundation for scalable analysis of AT loading in ecologically valid environments. While this study focuses on basketball, a high-risk environment for ATR, future work could apply this pipeline to other high-risk settings, such as pickleball.

# Eddy Current Braking for Dynamometric Devices

**Charles Olson**

Faculty Mentor: Dr. John Drazan

School of Engineering and Computing

Booth: 165

*This research is affiliated with Sigma Xi*

**Abstract:**
Isokinetic dynamometry is the gold standard for assessing muscle function in clinical environments, but existing systems are expensive and occupy large amounts of valuable clinical space. This project developed and evaluated a compact eddy current brake (ECB) as a low-maintenance, velocity-dependent resistance mechanism suitable for dynamometric use. Analytical modeling was used to characterize torque generation as a function of angular velocity, air gap, and conductor properties. A benchtop prototype incorporating a rotating aluminum disk and neodymium magnet array was constructed, with integrated torque and speed measurement. When tested with applied moments, the system exhibited minimal hysteresis and stable thermal behavior over short duty cycles. These results support the feasibility of ECB-based resistance for dynamometry, with ongoing work focused on refinement of design and further testing to determine the accuracy of the analytical model.

# Enhancing Access to Institutional Knowledge: A Scalable AI Chatbot Solution Using Microsoft Copilot Studio for the City Bar Justice Center

**Adrian Gallant, Arshad Mirishkari, Obed Ur Rahman, Venkatesh Nunna**

Faculty Mentor: Dr. Mallika Arachchilage Danushka S. Bandara

School of Engineering and Computing

Booth: 166

*This research is affiliated with Sigma Xi*

*This research was also presented at the American Society for Engineering Education, Northeast, 2026*

*This research was supported by the Hardiman Scholars Fund*

**Abstract:**
The City Bar Justice Center, the largest division of the New York City Bar Association's charitable affiliate, provides critical civil legal services to over 27,000 low-income New Yorkers annually. Despite its impact, the organization faces operational inefficiencies due to the time-intensive process of locating information across a vast internal repository of approximately 426,000 documents stored in Microsoft SharePoint. These documents, ranging from policies and procedures to legal guides, are essential for staff, attorneys, and volunteers delivering services in housing, family law, consumer rights, public benefits, employment, and small business support.This project proposes the development of an internal AI-powered knowledge system using Microsoft Copilot Studio within the Microsoft ecosystem. The solution will function as a chatbot-style interface that enables users to query natural language questions and receive accurate, context-aware responses derived from the organization's document library. By leveraging secure integrations with SharePoint and scalable cloud infrastructure, the system ensures data privacy while maintaining high performance and reliability. What could take a new employee over an hour of effort searching for documentation or asking fellow employees for help can now be done in a couple of minutes with the AI-powered knowledge system. The implementation emphasizes ease of use, rapid deployment, and cost efficiency, making it accessible for non-technical users while minimizing infrastructure overhead. Additionally, the platform's scalability allows the Justice Center to expand its capabilities as data and user needs grow. By significantly reducing time spent searching for information, the chatbot enhances organizational efficiency, empowers staff and volunteers, and serves as a useful test case for how generative AI chatbots can be implemented to support organizational knowledge management.

# AI-Assisted Legal Information Access: Designing a Responsible Chatbot for the City Bar Justice Center

**James Geib, Jack Stow, Naqibahmed Kadri**

Faculty Mentor: Dr. Mallika Arachchilage Danushka S. Bandara

School of Engineering and Computing

Booth: 167

*This research is affiliated with Sigma Xi*

**Abstract:**
The City Bar Justice Center (CBJC) provides critical civil legal services to underserved populations, yet users often face challenges locating relevant information within its extensive website and resource library. Improving accessibility while maintaining legal and ethical safeguards presents a significant challenge, particularly when considering the use of AI-driven solutions.This project implements an AI-powered chatbot designed to improve user access to CBJC's publicly available legal resources. The system enables users to submit natural language queries and receive context-aware responses generated through a retrieval-augmented generation (RAG) pipeline built on Microsoft Azure services. Responses are grounded in verified website content, presented in simplified language, and structured to ensure informational clarity while strictly avoiding the provision of legal advice.A key focus of the project is evaluating whether such a system can operate within acceptable performance and risk boundaries. The chatbot achieves sub-10-second response times through efficient retrieval and streaming techniques. In latest user acceptance testing with nine CBJC staff members, the system achieved a 63.6% acceptable response rate, with further improvements ongoing. This project delivers a production-oriented system designed to meet real-world performance, usability, and maintainability requirements. Our results also demonstrate that an AI-assisted approach can be implemented effectively within strict organizational, risk, ethics, and compliance considerations.

# Felidetect: An Advanced Cloud-Based Bioacoustic Platform for Multi-Species Big Cat Conservation Monitoring

**Arshad Faraz Mirishkari**

Faculty Mentor: Dr. Mallika Arachchilage Danushka S. Bandara

School of Engineering and Computing

Booth: 168

*This research is affiliated with Sigma Xi*

*This research was also presented at the American Society for Engineering Education, Northeast, 2025*

**Abstract:**
Conservation monitoring of endangered big cats faces critical challenges including invasive data collection methods, species-specific acoustic variations, and scalable processing capabilities. This research presents Felidetect, a sophisticated cloud-based bioacoustic platform that has evolved from a single-species detection tool to a comprehensive multi-species monitoring system supporting Amur leopards, Amur tigers, and jaguars. The system features species-optimized detection algorithms that account for unique vocal characteristics—jaguar SAW calls (40-400 Hz, more sustained duration) versus higher-frequency leopard calls—achieving 90%±2% detection accuracy while significantly reducing false positives. Key innovations include intelligent parameter tuning, Azure cloud deployment for scalable processing, Google Drive integration for automated bulk workflows, and advanced memory optimization for large audio files (60+ minutes). The web-based interface eliminates technical barriers, enabling conservation researchers and zoo staff to monitor reproductive cycles non-invasively, potentially reducing estrus detection time from months to days. With processing speeds of approximately 45 seconds per file and the ability to handle thousands of audio files through automated workflows, Felidetect represents a significant advancement in scalable conservation technology that bridges the gap between complex bioacoustic analysis and practical field applications.

# Graph Neural Networks for Adaptive Education: Leveraging High-Order Action Sequences in EdNet

**Sidharth Kumar Pradhan**

Faculty Mentor: Dr. Mallika Arachchilage Danushka S. Bandara

School of Engineering and Computing

Booth: 169

*This research is affiliated with Sigma Xi*

*This research was also presented at the Human-Computer Interaction International 2026 (HCII 2026)*

**Abstract:**
Knowledge Tracing (KT) is a pivotal component of Intelligent Tutoring Systems (ITS), aiming to predict students' future performance based on their historical interactions. While deep sequential models like Deep Knowledge Tracing (DKT) have advanced the field, they predominantly rely on correctness-only data, often neglecting the rich behavioral context found in action sequences and the high-order structural relationships between curriculum items. In this paper, we propose a graph-based framework that integrates student-question bipartite graphs with curriculum-based connectivity to capture these complex dependencies. Utilizing the EdNet-KT2 dataset, we constructed a heterogeneous graph from 396,070 interactions across approximately 5,000 students. We evaluated three Graph Neural Network architectures — GCN, GAT, and GraphSAGE — against traditional machine learning baselines. Our experiments demonstrate that the inductive GraphSAGE model achieves an Area Under the Curve (AUC) of 0.7432, significantly outperforming Logistic Regression (0.6090) and Gradient Boosting (0.6151). These findings suggest that incorporating granular behavioral logs and graph topologies significantly enhances the predictive accuracy and interpretability of adaptive education systems.

# Automated Legal Data Reporting Using Power BI

**Sania Seyal, Anthony Crocco, Angus Chen, Josue Syvelsaint**

Faculty Mentor: Dr. Mallika Arachchilage Danushka S. Bandara

School of Engineering and Computing

Booth: 170

*This research is affiliated with Sigma Xi*

**Abstract:**
This project presents the design and implementation of an interactive Power BI dashboard for the City Bar Justice Center (CBJC), the largest division of the New York City Bar Association's nonprofit affiliate, which provides free civil legal services to underserved communities across New York City. Currently, CBJC relies on a manual, multi-step process to extract case-level data from LegalServer — the organization's case management platform. Staff must generate separate report exports for each of the 12 legal service programs, then stitch the files together in a spreadsheet before any cross-program analysis can be performed. This workflow is time-intensive, error-prone, and hampers timely decision-making. To address this challenge, we developed an automated data pipeline that integrates LegalServer's Reports API with Power BI. The resulting dashboards support the analysis of key performance indicators, including cases opened and closed and financial benefits, through more than three interactive filters (project, intake type, and date) and dynamic visuals such as trend analyses, heat matrices, and summary indicators. Results indicate a reduction in reporting steps from four to six manual exports down to one automated refresh, a decrease in report generation time from approximately one to two hours to under 20 minutes, and improved access to consolidated data across all 12 programs for organizational decision-making. This framework and process is applicable to other nonprofit or data-driven environments, where similar API-driven integrations and business intelligence tools can be leveraged to centralize data, automate reporting workflows, and facilitate more informed, data-driven decision-making without requiring extensive technical infrastructure.

# Mine Tailing Impoundments Detection on Heterogeneous Satellite Imagery Using Advanced Deep Learning Algorithms

**Naqiabahmed Kadri**

Faculty Mentor: Dr. Sidike Paheding

School of Engineering and Computing

Booth: 171

*This research is affiliated with Sigma Xi*

**Abstract:**
Mine tailing impoundments are mining structures designed to store toxic byproducts of mining operations, such as heavy metals. Effective monitoring of these sites is essential to mitigate environmental risks such as soil and water contamination, ecosystem degradation, and potential catastrophic failures. However, automated detection of mine tailing impoundments from satellite imagery remains highly challenging due to the significant heterogeneity in their visual appearance, size, shape, surrounding landscapes, and spectral characteristics across different geographical regions and environmental conditions. This study presents a comprehensive benchmark of state-of-the-art deep learning-based object detection models on a custom, globally diverse dataset of Sentinel-2 satellite imagery. The evaluated models include the latest YOLO family architectures as well as transformer-based detectors such as RT-DETR and RF-DETR. All models were trained and evaluated under a unified experimental pipeline to enable fair and direct performance comparison. Results highlight the persistent difficulties posed by the high heterogeneity of satellite imagery. The study concludes that improving detection robustness will likely require the integration of richer multi-spectral and multi-temporal information, along with more advanced multi-scale feature extraction and domain-adaptive techniques.

# A Hybrid Deep Learning and Signal-Processing Approach for Multi-Modal Aerial Image Translation

**Sidharth Kumar Pradhan**

Faculty Mentor: Dr. Sidike Paheding, Dr. Danushka Bandara

School of Engineering and Computing

Booth: 172

*This research is affiliated with Sigma Xi*

**Abstract:**
Multi-modal aerial translation enables analysts to access complementary sensor modalities even when some sensors are unavailable. This paper presents StagAI, a hybrid system developed for the MAVIC multi-modal aerial translation challenge. The approach combines deep learning and classical signal-processing methods depending on data availability across tasks. For SAR to EO translation, we train a GAN-based model with a speckle-aware preprocessing pipeline to mitigate SAR noise. For tasks without training data (SAR to RGB, SAR to IR, and RGB to IR), we employ carefully designed training-free pipelines based on adaptive histogram translation and variance-weighted fusion. This hybrid strategy leverages data-driven learning when sufficient paired data exist while maintaining robust performance in low-data settings. The resulting system achieved a top-5 place on the CodaBench leaderboard with an overall score of 0.563, demonstrating the effectiveness of combining learned and classical approaches for multi-modal aerial translation.

# Risk Severity Recognition in Large Language Models: Evidence of High-Stakes Safety Failures

**Sidharth Kumar Pradhan**

Faculty Mentor: Dr. Sidike Paheding

School of Engineering and Computing

Booth: 173

*This research is affiliated with Sigma Xi*

**Abstract:**
This paper presents a severity-focused evaluation framework for assessing large language models (LLMs) in suicide risk assessment contexts. Using a dataset of 193 multi-stage clinical conversations labeled according to Columbia-Suicide Severity Rating Scale (C-SSRS) categories (low, moderate, high, and crisis), we examine how effectively LLMs recognize and respond to varying levels of clinical risk. Our evaluation employs two complementary approaches: direct severity classification and response-level decisioning that distinguishes empathic engagement from protective intervention. We prioritize recall-weighted metrics, particularly high-severity recall for crisis and high-risk cases, reflecting ethical imperatives of non-maleficence. Results reveal critical safety failures: models demonstrate severity-triggered performance collapse precisely when stakes are highest. This work contributes a clinically grounded evaluation methodology, empirical evidence of systematic high-risk vulnerabilities, and actionable design implications for intervention-focused model training.

# Thermal Performance of Metal-Printed Hybrid Gyroid-Diamond TPMS Structures embedded with PCM

**Michael Felix**

Faculty Mentor: Dr. Sriharsha Sundarram

School of Engineering and Computing

Booth: 174

*This research is affiliated with Sigma Xi*

**Abstract:**
Phase change materials (PCMs) offer high latent heat storage capacity but suffer from inherently low thermal conductivity, limiting their effectiveness in compact thermal management applications. This study investigates the use of hybrid Triply Periodic Minimal Surface (TPMS) lattice structures embedded within Paraplast paraffin PCM to enhance heat transfer performance. A hybrid Gyroid-Diamond TPMS geometry, alternating between the two topologies across six bands along a curved S-shaped path, was designed using MATLAB-based implicit modeling and fabricated at three relative densities of 25%, 35%, and 45% using metal additive manufacturing. The hybrid configuration was selected to exploit the complementary heat transfer characteristics of the two TPMS types within a single structure. Lattice samples were infiltrated with molten Paraplast and subjected to controlled heating experiments using embedded thermocouples to measure melting behavior and thermal response. Results are evaluated by tracking phase change progression through each sample and comparing thermal behavior across the three density conditions. This work provides experimental insight into how a hybrid TPMS topology combined with varying relative density governs PCM thermal storage performance, contributing to the design framework for geometry-driven thermal management components.

# Portable Bandage Dispenser Pen

**Amber Santorelli**

Faculty Mentor: Dr. Susan Freudzon

School of Engineering and Computing

Booth: 175

*This research is affiliated with Sigma Xi*

*This research was supported by the Albert M. Loch Fund*

**Abstract:**
Patients taking anticoagulant medications have an increased risk of bleeding due to injury. Anticoagulants disrupt the bodies normal hemostasis process and decrease the bloods' ability to clot [4]. Prednisone a corticoid steroid medication that is used to treat a variety of autoimmune diseases has a common side effect of bleeding and bruising more easily even with the slightest trauma. Prednisone interferes with the body's ability to make collagen [1]. Patients taking these medications will experience a slight trauma injury and bleed profusely causing them to frantically search for a bandage. There is a need for a device that has quick and easy application of a bandage to an injured site. During fall immunization season a healthcare provider will vaccinate over 100 patients a day. Currently, healthcare providers have to manual open each individual bandage before placing it onto the patients' arm. There is a need for a device that can eliminate the step of opening each individual bandage during the immunization process. This project aims to design a medical device that can be used by patients who have an increased risk of bleeding with the slightest trauma. This device will also be designed for healthcare providers to use and ultimately improve workflow of clinical care specifically in vaccination sites. The medical device will handle slight trauma wounds up to 3 inches in length that occur in everyday life.

# Electropolymerized Polypyrrole and Graphene Oxide Films for Applications in Biosensors

**Surya Kaveri**

Faculty Mentor: Dr.Isaac Macwan

School of Engineering and Computing

Booth: 176

*This research is affiliated with Sigma Xi*

**Abstract:**
Electrodeposition through cyclic voltammetry (CV) is widely used in the development of biomedical devices such as biosensors. Graphene oxide (GO) and polypyrrole (PPy) were utilized as a composite material to synthesize an improved biological recognition element. GO provides high surface area and functional oxygen groups that enhance molecular interactions, while PPy offers excellent conductivity and ease of electrodeposition. However, pure PPy films often exhibit limitations in electron transfer efficiency and surface area. Ppy-GO composite films were electrodeposited using a three-electrode configuration consisting of a carbon rod working electrode, glassy carbon, counter electrode and silver reference electrode. Pyrrole concentration and deposition cycles were varied to optimize film thickness and electrochemical behavior. CV guided deposition, EIS monitored charge transfer resistance and SEM confirmed morphology. The Ppy-GO composite films showed improved electrochemical performance compared to pure PPy, with higher redox peak currents and lower charge transfer resistance. EIS measurements displayed a smaller semicircle diameter, indicating faster interfacial electron transfer. SEM analysis confirmed a more uniform film morphology with well dispersed graphene oxide within the PPy matrix. The composite films also maintained stable electrochemical behavior after incubation, demonstrating good durability for biosensing conditions. These enhancements arise from the high surface area and oxygen containing functional groups of graphene oxide, which support efficient electron transport and strengthen film structure. Overall, the study highlights the strong potential of Ppy-GO composites for biosensor applications.