

GRADUATE RESEARCH ACHIEVEMENT DAY

A Celebration of Research, Scholarship, and Creative Activities



February 28, 2024, Online

February 29, 2024, UND Memorial Union 214C

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SCHOOL OF GRADUATE STUDIES

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GRADUATE RESEARCH ACHIEVEMENT DAY

Feb. 29, 2024 | Memorial Union Ballroom 214C

Judging Session & Public Viewing: 1:00 p.m. to 3:00 p.m.

Program Break, Refreshments: 3:00 p.m. to 3:45 p.m.

Awards Ceremony: Begins 3:45 p.m.



Poster	Presenter	Program	Abstract Title
1	Mansurat Abdulmalik Ali	Environmental Engineering	Hyperspectral Imaging for the Detection of Microplastics in Soil

The surge in global plastic consumption has intensified the need to address environmental consequences from inadequate plastic management. Improper plastic waste disposal results in widespread dispersion, particularly in soil ecosystems, where microplastics (0-5 mm) are prevalent. Despite evolving identification techniques, an efficient, nondestructive approach remains a challenge. In response, our research employs hyperspectral imaging (HSI) with a near-infrared sensor (1000-1700 nm) to detect plastic polymers (PE, PP, PS). We aim to assess the system's efficacy and explore environmental variables (soil moisture, particle size) on polymer spectral intensity. Results reveal distinctive spectral features in specific bands (1015-1215 nm, 1360-1430 nm, 1530-1675 nm). Moisture analysis shows ascending absorptive responses with increasing polymer concentration (10-70%), while particle size correlates absorption peaks with concentration and size. HSI proves a powerful, non-destructive tool, demonstrating high sensitivity even at low concentrations, enabling accurate assessment of soil microplastic contamination.

2	Di Sun	Chemistry	One-Pot Synthesis of Red-Emissive Porphyrin Silicon Nanoparticles (pSiNPs) for Photo-Synergistic Therapy and Selective of Metal Ion Detection
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Silicon-based nanoparticles (SiNPs) have been investigated for their applications in a wide variety of cell labeling with low toxicity and biocompatibility. However, SiNPs are frequently reported to have a strong blue emission and not the more advantageous red/NIR emission. Porphyrin derivatives with red/NIR emission light property as well as their ability to generate reactive singlet oxygen and low dark toxicities have been applied as a photosensitizer in therapeutic applications such as photodynamic therapy (PDT) and photothermal therapy (PTT). However, the inherent of porphyrin is a lack of biodistribution due to its poor water solubility. In this work, Meso-tetra(4-carboxyphenyl)porphine (TCPP) is used and incorporated with N-(Trimethoxysilylpropyl) Ethylenediamine, triacetic acid, trisodium salt 35% (TMS-EDTA) to synthesize porphyrin-functionalized SiNPs (pSiNPs) with red-emission as well as give rise to excellent water solubility. The obtained pSiNPs were characterized by various analytical methods, Utilizing TEM and DLS the size distribution of the particles was determined to be 42.7 ± 1.5 nm, and zeta potential was tested to be -31.6 ± 2.8 mV. FT-IR, XPS, and XRD depicted silicon, carbon, nitrogen, and oxygen as the main elemental components and the main porphyrin ring of TCPP remaining present in the final pSiNPs product. The absorption and fluorescence spectroscopy determined the excitation wavelength at 414 nm and the double-peak emissions at 646 nm and 705 nm which was successfully utilized in the imaging of RAW264.7 cells using confocal microscopy.

3	Chandler Tobeck	Counseling Psychology	Suicide among American Indian/Alaska Native People: A Systematic Review
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American Indian and Alaska Native (AI/AN) populations experience profound mental health disparities because of centuries of colonization, forced displacement, oppression, and historical trauma. One such striking disparity is in rates of suicidal ideation (SI), which in some AI/AN samples is 2-3-times higher than SI reported among white samples. Therefore, the purpose of this systematic review is to examine the current research regarding risk factors for suicide among AI/AN populations. The systematic review searched databases including APA PsycInfo, APA PsycArticles, Academic Search Ultimate, CINAHL Ultimate, and ERIC for articles pertaining to suicidality among AI/AN people published in English-language journals between 2000 and 2023. After screening 214 abstracts for inclusion, 8 publications were carried through for full text evaluation and inclusion in this review. These studies report positive correlations found between SI and depressive symptoms, substance use, and violence (both direct and witnessed). As most research was cross-sectional, it is unclear whether these mental and behavior health concerns predict or result from SI in this population. Future research could clarify the temporality of these relationships, identify protective factors, and evaluate culturally adapted interventions to prevent and treat SI and other facets of suicidality in AI/AN populations.

4	Arash Tayyebi	Chemical Engineering	Enhancing Water Permeability of Commercial Reverse Osmosis Membrane Using Integrated ML-Based Surface Grafting
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Modifying reverse-osmosis (RO) membrane performance is challenging and time-consuming due to the complex interplay of various factors that influence the membrane's performance. We explored the potential of using machine-learning (ML) to graft the polyamide (PA) surface of an RO-membrane to increase water permeability and overcome the limitations of the permeability/selectivity tradeoff. We identified moieties with positive and negative contributions toward water permeability by applying Shapley-Additive-exPlanations (SHAP) analysis to our model. We attempted to improve the subunits of the PA's structure with positive Shapley values and graft the polyamide RO membrane layer of a commercial membrane, Dupont XLE, resulting in a substantial increase in water permeability from 1.7 ml/30min to 3.4 ml/30min. Our results demonstrate the potential of using ML to replace traditional trial-and-error methods for modifying PA-RO membrane polyamide layers and advancing the development of higher efficient and sustainable RO membranes for water treatment and purification applications.

Poster	Presenter	Program	Abstract Title
5	Jordan Jaeger	Public Health	Examining Racial and Sex Disparities in ADHD Diagnosis and Treatment among Children.

Access to care and treatment for mental health conditions is an important topic, as disparities may exist between specific groups. This study aims to examine disparities in ADHD diagnosis and treatment among race and sex, as past research has shown racial minorities and girls being less likely to be diagnosed and receive treatment compared to White or male children. The 2021 and 2022 National Survey of Children's Health (NSCH) datasets were used for analysis. Binomial and multinomial logistic regressions were conducted to examine ADHD diagnosis and treatment, respectively. Odds ratios from the analysis revealed significant associations between race, gender, and ADHD outcomes. Children who were Hispanic, Black, Asian, and identified as female had a decreased odds of being diagnosed with ADHD and receiving medication compared to children who were White or identified as male. Findings represent continuous disparities in access and treatment for mental health care for minority groups.

6	Brandon Narum	Earth System Science & Policy	Surrounding Landscape Composition Effects on Wild Bee Communities Across North Dakota
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Land use change from historic grasslands to cropland is a significant driver of species population declines. Loss of grassland resources is especially important for species that provide ecosystem services such as Bees. Bees offer a valuable ecosystem service and contribute to the maintenance of grassland plant communities. However, contemporary grasslands are highly fragmented and grassland-dependent insects are subject to adverse effects of surrounding cropland, such as pesticides. To address this, we are using a statewide survey of bee communities across North Dakota's grasslands to perform the first large-scale landscape analysis of wild bees across the state. Specifically, we are investigating the relationship of bees, separated into functional trait groupings such as body-size, to the proportion of different land cover types in the landscape surrounding our grassland study sites including potential bee habitat, key floral crops (e.g., sunflowers), and crops that are not key floral crops (e.g., corn).

7	Maria Zaman	Teaching & Leadership	The Relationship between International Students' Perceived English Language Competence and Academic Success in the U.S.
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Within this study we assess if there was an association between student's academic success based on their English language proficiency on academic purpose and self-efficacy. We surveyed thirteen international students on the factors of English language proficiency on academic purpose and self-efficacy. The participants reported high levels of English proficiency for academic purpose as well as self-efficacy. However, no association was found between the student's GPA and English Proficiency for academic purpose and self-efficacy.

8	Luca Beretta	Electrical Engineering	STEMnauts Atmosphere Independent Lander (SAIL) Electronic System for NASA Student Launch 2024 Competition
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The STEMnauts Atmosphere Independent Lander (SAIL) is an experimental high-power rocket payload designed for the NASA Student Launch 2024 Competition, containing an electronics system utilizing embedded, power electronics, and control systems design. SAIL's goal is to deploy during descent and safely land without the use of traditional parachutes.

The payload, designed as a UAS lander, features a propeller, landing legs, and a reaction wheel. During descent, the onboard computer (OBC) activates flight events through the power distribution board (PDB). Additionally, it controls two brushless motors and logs flight data.

Collaboration with fellow student engineers from various disciplines has been vital for the goal of satisfying rigorous physical, power, and software criteria for a successful mission.

Upon successful completion, the project anticipates safe and controlled payload deployment in flight, followed by post-landing data analysis for mission success.

Poster	Presenter	Program	Abstract Title
9	Chidiebele Oraegbuna	Biomedical Sciences	Activation of the Ghrelin Hormone Secretagogue Receptors Facilitates Neuronal Excitability and Spatial Learning and Memory in the Dentate Gyrus

Several neurological diseases have associated cognitive impairments and the available therapies provide minimal benefits, hence, the need for more beneficial strategies. Ghrelin is a hormone that has been shown to be involved in the differentiation of new neurons in the brain. The ghrelin receptors are expressed in the dentate gyrus granule cells (DG GCs), however, their roles in the DG and how they affect learning and memory remain to be determined. Using whole-cell patch clamp recording, we demonstrated that application of ghrelin produced significant depolarization and increased action potential firing in the DG GCs. This depolarization was dependent on the activation of adenylate cyclase and not by phospholipase C beta. Using the Y maze test, we also showed that microinjection of ghrelin into the DG increased memory abilities, which was blocked by an adenylate cyclase inhibitor. Our findings suggest a possible mechanism via which ghrelin augments learning and memory.

10	Sydney Raboin	Education, Health, & Behavior Studies	Visualizing Victory: The Role of Imagery in Empowering Athletes Battling Obsessive-Compulsive Disorder
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Obsessive Compulsive Disorder (OCD) is one of the most common mental health disorders that can make activities of daily life more challenging and adversely impact cognitive functioning, task execution, self-confidence, personal development, and overall wellbeing. OCD presents as uncontrollable and unsolicited thoughts and images, followed by obsession over them and an irresistible need to complete compulsive behaviors as an attempt to challenge them. OCD can impact mentality, attention, and behaviors, potentially hindering the enhancement and proficiency of skills and abilities, and creating difficulty for maintaining stability, responding to internal and external stressors, and exhibiting competency. Mental imagery can provide fundamental tools and coping mechanisms to aid in the management and treatment of OCD. This paper discusses OCD symptomatology, pathophysiology, epidemiology, and pathogenesis, and reviews imagery-based psychotherapy and educational sport psychology interventions that can support athletes with OCD, encourage their development, and make them more equipped to achieve success.

11	Benu Bansal	Biomedical Engineering	Analyzing cellular spatial distribution extracted from the Multiplex Immunofluorescence imaging data urothelial carcinoma
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Multiplex immunofluorescence (mIF) assists in tumor microenvironment cell phenotyping and spatial cell interaction monitoring. Using mIF-based digital image processing, researchers can map tumor cells and immune cells that infiltrate tumor tissues. Based on a recent logistic regression equation, this study validates the gene expression equation and examines its involvement in bladder cancer development using pathological image analysis. mIF and annotated H&Es were overlaid to assess whole-slide image (WSI) tumor and non-tumor areas. Spatial cellular distribution analysis was done, and expression profiles and density plots showed that the genes found were important in the equations. This research confirms that the equation significantly affects bladder cancer risk. This study also talks about the features of different layers of mIF image analysis in terms of the location of cell populations and patterns of cell distribution, which will help us understand the tumor microenvironment better.

12	Dilini Ekanayake	Biomedical Sciences	Repeated allergen consumption impairs intestinal barriers and promotes neurobehavioral pathologies in mice with subclinical cow's milk allergy.
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Food allergens are often implicated in behavioral problems in sensitized but tolerant individuals. We previously showed subclinical cow's milk allergy (CMA) mice exhibited depression-like behavior associated with brain neuroinflammation and cortical demyelination with repeated allergen exposure. We also found that adoptively transferred peripheral leukocytes from CMA mice migrated to the dura of naïve recipient mice. Hypothesizing that consumption of food allergens by sub-clinically sensitized individuals would cause intestinal damage and promote the trafficking of activated peripheral leukocytes to the dura to adversely affect the brain, we assessed neurobehavioral and intestinal pathologies in CMA mice. Behavioral tests indicated that the exploratory activity and short-term memory of CMA mice were significantly lower than controls. Cortical demyelination, microgliosis, axonal damage in the brain, and gut leakiness were detected. Our results suggested that repeated allergen consumption could trigger immune responses by increasing gut permeability in susceptible individuals.

Poster	Presenter	Program	Abstract Title
13	Eunsong Kim	Music	The Motivation and Passion of Adult Amateur Pianists

Playing the piano is becoming increasingly popular among adults, with people of all ages eager to enjoy music on the piano. Adult students are self-motivated, choosing to play the piano by themselves based on their interest and love for the piano. Piano pedagogy for adults should be given special consideration because adult students have different characteristics than children. This study aims to understand the motivation for piano studies for adult students who take piano as their hobby. I will specifically investigate the impact of piano studies on adult students' lives and why they decided to learn the piano. I will then identify how the research participants describe the outcomes of piano studies in their jobs and lives. This case study focuses on an individual's different learning patterns and characteristics. Thus, the significance of this study is giving implications for piano instructors devoted to adult piano education.

14	Shereen Ismail	Computer Science	A Blockchain-based Fish Supply Chain Framework for Maintaining Fish Quality and Authenticity
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The fish supply chain (FSC) industry faces a significant challenge in terms of maintaining fish quality and authenticity throughout the chain. The main goal of modern FSC systems is tracking and tracing the fish product at each stage, from harvester to end customer, as well as assessing its quality and authenticity. Integrating FSC with new technologies, such as Blockchain (BC), Big Data, Artificial intelligence (AI), and Internet of Things (IoT), enhances fish product traceability, authenticity, visibility, and security. We propose a BC-based FSC framework that follows a layered architecture consisting of a SC layer, an IoT layer, and a BC layer. We integrate a new AI-based hand-held device, a Quality, Adulteration & Traceability (QAT) device, that can identify fish species and assess fish quality. We leverage the key features of BC and smart contracts, deployed over the Ethereum platform for the proposed framework integrated with QAT technology. Extensive validation of smart contracts is conducted to prove its practical feasibility.

15	Kirby Huber	Chemistry	Silicon Quantum Dot (SiQD) FRET Efficiency
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Nanomaterial energy transfer studies have grown in popularity over the last two decades. When fluorescent nanomaterials (donors) are near a fluorophore (acceptor) that has an excitation peak that overlaps with the nanomaterials emission peak, the nanomaterial can transfer its excitation energy to the acceptor. Understanding these mechanism is crucial in improving energy transfer efficacy. The outcome of this understanding leads to improvements in disease detection and diagnosis, cancer treatment, photovoltaics and a myriad of other applications. My project is looking at a novel donor acceptor pairing using amine terminating SiQDs (donor) and TAMRA (acceptor). FRET occurs between the pair and efficiency is being determined using calculation that include measuring quantum yield, fluorescence intensity and fluorescent lifetime.

16	Devika Panicker	Counseling Psychology	Intersecting Identities and Intersectional Experiences: Exploring the Experiences of Racism and Heterosexism in BIPOC LGBTQ+ Individuals
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Racial trauma, heterosexism, and perceived discrimination have a significant impact on various aspects of the lives of BIPOC LGBTQ+ adults living in the US every day. This social justice issue affects not only their well-being but also other factors such as their health outcomes, relationships, and identity development (Lee & Waters, 2021; Lehavot & Simoni, 2011; Williams et al., 2019). Utilizing the lens of intersectionality theory and minority stress theory, this presentation aims to explore: (1) how individuals with minoritized intersecting identities experience various stressors, such as racism, heterosexism, and discrimination associated with their racial, sexual, and/or gender identities; (2) the intersectional experiences of BIPOC LGBTQ+ individuals by examining the unique stressors that they experience at different contexts within society at the micro- and macro-level; and (3) the impact of these distressing intersectional experiences on their overall mental health and well-being.

17	Tanzim Jim Hassan	Electrical Engineering	UAS-guided Electric and Magnetic Field Data Distribution Across Transmission Lines
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This poster discusses an electric (E) and magnetic (H) field data gathering process across a series of High Voltage (HV) transmission lines. Data was collected from one DC and four AC Transmission (Tx) lines. Multiple DJI UAV (M2EA, M30, and M300) were used to collect E/H field measurements with an onboard set-up. These measurements included parameters such as E field in V/m, H field in mG, Battery voltage in V, Battery current A, Battery percentage in %, Battery Temperature in F, and latitude and longitude. The preliminary findings indicate that distance and sensor orientation affect E/H field distribution.

Poster	Presenter	Program	Abstract Title
18	Debdutta Nath	Biology	Temporal Alteration in Soil Microbial Community Composition and Function in CRP grasslands

Soil microbes are crucial in ecosystems by delivering nutrients to plants and promoting healthy and fertile soil. Soil management practices can potentially improve soil health. Conservation Reserve Program (CRP) is an example of a grassland restoration program in the United States which is considered to improve soil health. However, the role of soil microbes in CRP-managed soil is unclear because we don't yet know the patterns of microbial assembly and recruitment in restored soil. To answer this, I propose to sequence soil bacteria, fungi, and protists in a chrono-sequence of lands under CRP in comparison to agricultural lands and natural lands. I suggest testing soil physicochemical properties to distinguish soil bacterial communities regionally and assessing relative abundance of soil bacteria and fungi over time. However, more research is needed for an ecological understanding on soil restoration and what factors and procedures are driving the microbial assembly in restored grassland soil.

19	Komal Mangle	Education, Health, & Behavior Studies	Evaluation of injured athletes' motivation during the recovery process using the Transtheoretical Model
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Injuries can have a considerable impact on an athlete's life. Having the willingness to participate in sport post-injury requires a change in emotions, cognition, and behavior. The athlete's motivation and different motivational elements that impact athletes' performance and their ability to recover from injuries are crucial components of this change. However, determining what motivational factors are affecting injured athletes to push them to go through the 'transition phase' of the recovery process has yet to be investigated. SMS-II will be administered to determine if injured athletes are intrinsically or extrinsically motivated or amotivated. To evaluate if the athletes are mentally prepared to participate in the sport post-injury, IPRRPS will be used. And to evaluate which stage of the Transtheoretical Model the athlete is in, URICA Scale will be used. It is hypothesized that athletes who are more intrinsically motivated will have a more significant change of positive behavior post-injury.

20	Shree Ram Abayankar Balaji	Computer Science	Cybersecurity Challenges and Solutions in IoT-based Precision Farming Systems
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Adaptation of technologies such as the Internet of Things (IoT), Unmanned Aerial Vehicles (UAVs), and blockchain in agriculture has revolutionized farming activities, offering several benefits such as increased efficiency, reduced costs, and improved crop yields. However, these advancements also have their fair share of security challenges, opening space for vulnerabilities that adversaries can exploit and compromising agricultural IoT networks, autonomous farming equipment, and vehicles. This may lead to compromised services and devices disrupting farming activities, causing losses to the farmers. This paper captures the state-of-the-art review of IoT-based precision farming systems, including the technological applications, cybersecurity challenges, and mitigation measures to secure the agricultural environment.

21	Carlos Munoz	Physics	Investigation of SiO ₂ Thin Film Resistance and Capacitance using X-ray Photoelectron Spectroscopy
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Knowledge of the electronic properties of materials at interfaces is paramount to the development of novel devices and new technologies. Additionally understanding how radiation can damage these devices has importance in space applications and other high radiation environments. Using an XPS (x-ray photoelectron spectroscopy) method originally for thin film silicon nanoparticles (SiNPs) [1] we measured the electronic characteristics of Silicon dioxide (SiO₂) films grown on p-type and n-type Si(001) samples. By applying DC or AC external bias, we were able to extract the resistance and capacitance of the oxide layer using the shifts in the binding energy of Si 2p peak. The measurement consists of the application of 10V DC or AC square wave pulses of 10V amplitude to the sample at various frequencies ranging from 400μHz to 1kHz. Measurements were also repeated under different X-ray intensities to quantify the effect of radiation on the electronic properties of the sample.

22	Andrea Doyon	Counseling	Consent Teachings in Sex Education: A Qualitative Study
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A comprehensive teaching of sexual consent is a crucial and necessary component for safely engaging in sexual activity, seeing as an absence of consent during sexual intimacy constitutes sexual violence (Beres, 2014). The current study aims to qualitatively explore sex educator's beliefs about sexual consent and how it is included in their sex education curricula. Additionally, their perceptions of the sexual education curricula overall, and more specifically how their students are responding to information regarding sexual consent will be further explored. Our intent is to better understand the experiences and attitudes held by sex educators in rural Midwestern schools about teaching consent in sex education courses, and their perceptions of what role community attitudes have on the teaching of sexual consent. Findings from this study have the potential to significantly improve current consent teachings, thus, functioning as sexual assault prevention.

Poster	Presenter	Program	Abstract Title
23	Mina Gholipour	Chemical Engineering	Sustainable Jet Fuel Production from Corn Stover-Derived Lignin using a Novel Reaction Scheme

The development of alternate jet fuels can help to mitigate global climate change. In this research a novel seven step system was designed and verified at the continuous bench-scale rate of 8L/hour inlet feed rate to convert corn stover-derived lignin into cyclohexane which can be used as a jet fuel. This system consists of a non-catalytic fragmentation reactor, an extraction column, target fragments recovery steps and a Ni₂P/SiO₂ catalyzed hydrodeoxygenation reactor. To date, we have demonstrated that at least 13 wt% of the carbon in the inlet lignin can be converted into cyclohexane.

24	Gabriella Montero	Counseling Psychology	Exploring Impacts of Multigenerational Historical Trauma on Indigenous Academic Outcomes
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The proposed study aims to explore how multigenerational historical trauma impacts academic outcomes for K-12 Lakota students. A secondary purpose of this study is to fill a gap in current literature on North American Indigenous research by gaining cultural humility surrounding the Indigenous school experience. The study will take a qualitative approach with a semi structured interview to explore participant narratives, and experiences. Participants must identify as Indigenous, be an enrolled member of the Lakota Sioux Tribes, and have had direct relatives or ancestors attend boarding school. Researchers will use content and narrative analysis to identify patterns and themes from participants. The findings of this study may improve the cultural knowledge and awareness in educators and clinicians, identifying any educational gaps, and enhancing the learning experiences of Indigenous students.

25	Nelofar Nargis	Clinical Translational Science	Enhanced Therapeutic Efficacy Using Apto-253/Cisplatin Combination Treatments on Arsenite-Transformed Bladder Cancer Cells
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Arsenic exposure increases the risk of developing urothelial cancer (UC). Muscle-invasive (MIUC) cases have a worse prognosis and can develop resistance to traditional cisplatin-based therapy. Elevated MYC, SOX2, and reduced KLF4 expression impacts UC survival. Our lab malignantly transformed normal urothelial cells via chronic arsenite exposure (As-T cells) that molecularly resemble the basal subtype of MIUC. These As-T cells display elevated MYC, SOX2, and reduced KLF4. The As-T cells were treated with APTO-253, a MYC inhibitor/KLF4 activator, and/or cisplatin. As-T cells treated with APTO or cisplatin alone showed increased apoptosis, while the combined treatment demonstrated enhanced cell death and reduced sphere-forming ability. These results demonstrate the efficacy of APTO alone or in combination with cisplatin and sets the stage for in vivo studies to evaluate its effect on tumor growth/invasion.

26	Fang Liu	Teaching & Leadership	Exploring the college students' EFL learning engagement under the context of blended learning
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Engagement is a leading indicator of performance and ultimate attainment. Considering the pivotal role of students' academic engagement in their success, discovering the intrinsic and extrinsic factors that inspire students to engage in class activities seems crucial. This research attempted to increase English language learners' engagement by engaging them not only cognitively but emotionally as well. There is a need to see and improve the low interest, less motivation, and low outcome through research to help teachers to develop a full understanding that can help them to determine the best delivery option for that outcome. Hence, this research aims to analyze the students' engagement on online study and their in-person study with teachers in classroom by comparison to see how the blended instruction need to be modified and improved. The study has some main findings: Lower cognitive engagement but higher emotional engagement in online learning. Learning engagement wasn't affect by genders or degree program levels. There are significant differences between online and in-person learning on the behavioral and cognitive engagement. Pedagogical implications were discussed.

27	Jerjes Porlles	Energy Engineering	Hydraulic Fracturing and Reservoir Simulation Modeling of Enhanced Geothermal System Optimization for Economical Energy Production
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An enhanced geothermal system (EGS) extracts heat from hot dry rock geothermal resources. Heat extraction occurs by passing injected fluids through deep fractured networks rather than applying hydraulic fracturing (HF) to create a fractured network. This study develops an overview of the simulation-based pattern model and evaluation of the initial heat capacity, recovery factor, mass flow rate, thermal energy recovery, pressure drop, and heat loss. Then, we developed laboratory experiments with new proppants with high resistance properties to use as part of the HF treatment under different closure stresses. Finally, we analyze the economic issues of HF treatment, a sensitivity analysis, and an NPV and LCOE evaluation. A 3D numerical simulation model was designed to determine the best pattern. The results from the scenarios indicated that a variable fracture permeability extracted 38% less than the first scenario over 30 years. Finally, the economic evaluation of HF shows that the NPV was positive when the price of electricity was more than US\$150/MWh.

Poster	Presenter	Program	Abstract Title
28	Yeqian Xue	Earth System Science & Policy	Pollinator Habitat in ND Right-Of-Ways: A road survey approach

Road ditch provides the diversity of floral resources for pollinators. This project focuses on the road ditch as a pollinator habitat in North Dakota, which also makes a comparison between road ditches and other pollinator services in an economic way. The planned activities involve fieldwork with road surveys, and geospatial analysis, combined with machine learning algorithms. The results will be useful for policy-makers to better manage public lands in supporting pollinator habitat.

29	Dana Conzemius-Schindler	Counseling Psychology	An Exploratory Investigation of the Impact of Psychological Intimate Partner Violence on College Women: A Qualitative Study
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Researchers have found psychological intimate partner violence (P-IPV; defined as emotional and verbal abuse utilized to degrade, demean, create fear, control, or isolate; Tolman, 1989; Sullivan et al., 2012) is detrimental to mental health functioning, including increased sexual risk behaviors, depressive and anxious symptomology, and relationship dissatisfaction (Hellemans et al., 2015; Overstreet et al., 2015). Despite this, little is known regarding the academic and psychological lived experiences of survivors of P-IPV. The aim of the current proposed study is to qualitatively explore the lived experiences of female college students exposed to psychological intimate partner violence while in college. Specifically, we hope to gain insight into (a) the perceptions and definitions of P-IPV from the survivors' viewpoint; (b) how experiences of P-IPV interacts survivors' academic performance and self-efficacy; (c) how P-IPV interacts with survivors' sense of belonging on campus; and (d) the relationship between P-IPV and the survivors' overall wellbeing.

30	Eric Pierce	Electrical Engineering	Electric Motorcycle Test Bench
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Electric motorcycles require interaction between several subsystems. Prototype construction is time-consuming and expensive, and may not provide accessibility to individual components, wires, and signals for testing and development. An electric test bench provides a working system model of an electric motorcycle capable of validating and introducing both physical components and simulated digital twins, allowing tests and design modifications while minimizing resource inputs.

Using an electric test bench enables controller development. The controller serves as the central nervous system for an electric motorcycle, it communicates with every sensor and electrical subsystem on the motorcycle. The primary function of the controller is to provide motor control to the BLDC motor, adjusting power as torque demand changes. The controller is also responsible for the Battery Management System, user interface, and safety features.

31	Anahita Mansouripour	Biomedical Sciences	The bile acid regulation of the intestinal epithelial cell hemostasis during bacterial-induced colitis
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Enteric bacterial infections are of great global health concern. These infections can cause a range of clinical symptoms, from ephemeral diarrhea episodes and non-specific gastrointestinal symptoms to severe colitis and serious organ dysfunction. The intestinal epithelial cells (IECs) have intimate contact with a variety of enteric pathogens, microbial metabolites, and immunomodulatory molecules, including bile acids (BAs). The BAs are known to regulate the IECs' functions in health and disease by modulating apoptotic pathways and enhancing IEC proliferation during intestinal insults. Using a murine model (C57BL/6) of bacterial-induced colitis, we have investigated the roles played by BA signaling during enteric infection with *C. rodentium* infection. We have found a functional BA signaling pathway protects IECs from cell death most likely by modulating the inflammasome and autophagy pathways. Targeting the BA signaling, and autophagy may provide novel approaches for preventing a wide array of chronic conditions like inflammatory bowel disease (IBD).

32	Shaylah Anderson	Counseling Psychology	Exploring the Stories of Growing up Rural and LGBTQ+: A Narrative Analysis of Challenges, Strengths, and Identity
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Rural LGBTQ youth face significant challenges, barriers, and health disparities compared to their urban counterparts. While most research shows the challenges and barriers of growing up as sexual and gender minorities in a rural community, little research has explored the richness of their stories and lives. Consequently, LGBTQ youth are frequently pathologized and seen as inferior, rather than unique, to urban counterparts. This study will seek to better understand how LGBTQ youth navigate identity within rural spaces by analyzing the stories they tell, and the meaning given to those narratives through their individual and collective experiences. This analysis will use a strength-based approach to gather stories of strength, resilience, and uniqueness alongside the potential challenges and barriers of growing up in rural communities. Under a constructivist and intersectional paradigm, the collected data will be analyzed with narrative analysis to create a coherent narrative that identifies key themes, similarities, and differences.

Poster	Presenter	Program	Abstract Title
33	Mulugeta Amare	Civil Engineering	Traffic Crash Hotspot Analysis and Comparison of The Effect of In-Crosswalk Traffic Signs on Pedestrian Safety

Traffic crashes pose challenges to ensuring traffic safety, necessitating resilient engineering practices. Pedestrian safety is a significant concern, with pedestrian-related fatalities increasing from 13% to 18% in the past decade. Hotspot crash location identification, considering crash severity and traffic volume, is crucial for informed safety measures. Studies have investigated the application of regulatory traffic signs but have not made a significant comparison among different signs. This research employs Geographic Information System tools to assess the spatiotemporal clustering of crashes and conducts a comparative analysis of in-crosswalk "YIELD TO PEDESTRIAN" and "STOP FOR PEDESTRIAN" signs to enhance pedestrian safety. Results indicate that Getis-Ord and Anselin Local Moran's statistics are effective in identifying crash hotspot locations. The traffic signs analysis shows significant impacts on vehicle speed and improves yielding to pedestrians. However, the study suggests interchangeability between the two signs, as their effects on speed and yielding are not significantly different.

34	Savannah Brown	Clinical Translational Science	SLFN12 overexpression significantly effects the expression of cancer-related genes in response to chemotherapy drugs.
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Schlafen12 (SLFN12) is an intermediate human Schlafen protein shown to have a correlation with survivability in triple negative breast cancer (TNBC). SLFN12 causes differential expression of important cancer genes, but how they change in response to chemotherapy remains unknown. Our aim is to identify genes that improve TNBC outcome following SLFN12 overexpression. Treating SLFN12 overexpressing TNBC cells with camptothecin (CPT), paclitaxel, zoledronic acid, or carboplatin resulted in differential expression of seven carcinogenic genes. Notably, GJB3 was downregulated following treatment with each chemotherapy agent evaluated. SLFN12 induction with IFN- α resulted in decreased cell proliferation and increased SLFN12 mRNA levels following treatment with paclitaxel or carboplatin. These results suggest that SLFN12 overexpression significantly affects the expression of genes driving phenotypic changes in response to chemotherapy drugs. This may contribute to improving survival for patients with SLFN12 overexpression. Additionally, patients SLFN12 levels can be used as a factor when pursuing personalized chemotherapy treatments.

35	Hyungwoo Jo	Education, Health, & Behavior Studies	In-Flight Approach & Landing: The Unknown Variable
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Although many flight schools have navigated instructional methods to improve airmanship and prevent accidents, the National Transportation Safety Board (NTSB) continues to receive a chain of accident reports involving instructional flights. While learning the interpretation of flight parameters and scanning techniques is considered imperative in flight, no standard scanning procedures have been established to help pilots apply during the transition phase of approach and landing. This research is to 1) identify deficient areas of teaching procedures related to scanning techniques and depth perception during approach and landing, 2) survey the application of in-flight eye-tracking movements during approach and landing, and 3) provide pilot schools with standardized instructional information to supplement teaching tools during approach and landing. The findings of this study continue to augment landing proficiency by incorporating the concept of energy management through the application of increased situational awareness.

36	Alireza Hasani	Civil Engineering	Large-Scale Additive Construction Utilizing A Robotic Arm
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The construction industry should consider embracing technological advancements in order to thrive in a constantly changing environment. Incorporating cutting-edge technologies can enhance construction productivity, improve quality standards, optimize expenses, and maximize resource utilization. Additive manufacturing (AM), which has already made progress in other sectors, such as automotive, aerospace, and medical device manufacturing, has the potential to completely transform the construction industry. Additive manufacturing has witnessed exponential growth over recent years in construction. The technology was shown to be advantageous, although with varying benefits observed in different cases, including but not limited to reduced cost, labor requirements, material, and construction time. Nevertheless, challenges, such as limited control over the quality, unexplored long-term performance, being counter-cost-effective in certain circumstances, manual intervention during printing, and the absence of adapted code and regulations were identified. In this poster presentation, an overview of required system, its capability, and applications are discussed.

Poster	Presenter	Program	Abstract Title
37	Neda Rezagholizadeh	Biomedical Sciences	Role of TLR7 in Tat-induced Cytokine Release in Astrocytes

HIV-1 Tat continues to play an important role in the development of HIV-associated neurocognitive disorder (HAND), even with combined antiretroviral therapy (ART). Despite ART, Tat secretion from infected cells continues, maintaining high brain levels. Tat's interaction with astrocytes triggers immune responses, with this study focusing on the underlying mechanisms. Consistent with the notion that Tat enters uninfected cells, we demonstrated that Tat entered endolysosomes in primary human astrocytes. Notably, only Tat with arginine-rich domain significantly increases IL-6 and IL-8 secretion, indicating this domain's critical role in immune activation. Further mechanistic studies using pulldown assays and colocalization studies demonstrated that Tat, but not mutant Tat, interacted with endolysosome resident Toll-like receptor 7 (TLR7). Significantly, siRNA knockdown of TLR7 attenuated Tat-induced increases in IL-6 and IL-8 in primary human astrocytes. Our findings suggest that Tat's interaction with TLR7 is a key mechanism driving astrocyte-mediated immune responses, providing insights into HAND's neuroinflammation development.

38	Maylynn Riding In	Educational Foundations & Risk Factor Patterns for Elder Abuse among US Indigenous Peoples: Native Elder Research	Maltreatment Survey Secondary Data Analysis
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The Native Elder Maltreatment Survey (NEMS) secondary data analysis will provide insight into the scope and nature of elder abuse and mistreatment among Indigenous populations. The NEMS aggregate dataset includes participants from seven tribal communities representing four Indian Health Service regions (n=568). The study will analyze the mean scores of the Hwalek-Sengstock Elder Abuse Screening Test and the subscales of the Native Elder Life Scales by region. The analysis will utilize measures of central tendency and measures of variability to provide a better understanding of the risk factor patterns for elder abuse by region.

39	Lidya Guteta	Civil Engineering	Effect of Coal Bottom Ash/Slag on Fresh, Mechanical, and Durability Properties of Concrete
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Raw materials depletion such as the sand used in concrete production has been a concern for the built environment. This research aimed to explore the effects of optimum Coal Bottom Ash (CBA) and Coal Bottom Slag (CBS) in concrete on fresh, mechanical, and durability properties. Experimental investigations were conducted to evaluate the characteristics of hardened concrete by substituting the optimum 50% fine aggregate determined from the previous study with CBA and CBS. Fresh, mechanical, and durability tests were carried out and results were compared to control concrete. Outcomes of this research revealed that CBA-based concrete increased compressive strength at an early curing age by 74.2%; however, splitting tensile strength and flexural strength were significantly developed at later curing ages. A higher modulus of elasticity and lower chloride ion penetration severity were also established. These findings indicate that CBA and CBS can be used as a fine aggregate replacement.

40	Yujie Xue	Chemistry	Persistent Luminescence Nanoparticles for Bioimaging and Biosensing
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Persistent luminescence nanoparticles (PLNPs) are emerging and promising luminescent nanoscale materials that can remain luminescent for minutes to several days after excitation has been curtailed. This unique optical property, termed luminescence stability or afterglow, makes PLNPs a compelling candidate for a variety of bio-imaging and bio-sensing applications. One of the most substantial challenges for bio-imaging tools is efficient signal intensity. PLNPs are the promising candidates to address this challenge due to their intense and persistent signal with little to no autofluorescence. In this work, zinc (II) nitrate, gallium (III) nitrate, germanium (IV) oxide, and chromium (III) nitrate were used to dope and mixed as an aqueous solution via the hydrothermal method to synthesize water soluble, luminescent nanoparticles with persistent luminescence. Utilizing transmission electron microscopy (TEM) and dynamic light scattering (DLS), the size distribution of the PLNPs was determined to be 45.5 ± 2.3 nm, with a corresponding zeta potential of $+44.4 \pm 0.9$ mV. ... (abstract truncated)

41	Sarah Zacher	Teaching & Leadership	Supporting Native American Student Self-Efficacy, Engagement, and Persistence Through Near-Peer Mentoring
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Increased attention to culturally responsive pedagogy and the need for culturally enriching experiences in the classroom has contributed to an emerging discourse in schools and academia on its positive effects on underrepresented students. However, less has been done to emphasize the implementation of these practices for Native American students in tribal and public schools. Additionally, little has been studied on the positive effects of culturally responsive practices and near-peer mentoring on Native American student self-efficacy, engagement, and post-secondary persistence. This study aims to organize the impact of peer mentoring on underrepresented students and how this framework can be adopted to encourage academic engagement, self-efficacy, persistence, and post-secondary success for Native American students.

Poster	Presenter	Program	Abstract Title
42	Duncan Oteki	Civil Engineering	Fatigue Cracking Evaluation of High RAP Asphalt Mixtures Modified with Crumb Rubber Enriched with Bio-oils.

This study used the simplified viscoelastic continuum damage (S-VECD) model to assess the fatigue behavior of North Dakota's asphalt mixtures. Eight mixtures typically used in North Dakota were sampled and subjected to fatigue and dynamic modulus $|E^*|$ tests to determine their damage characteristics and linear viscoelastic (LVE) properties, respectively. The outputs from the two tests were analyzed to obtain their damage characteristic curves, DR failure criterion parameters, and Sapp-index values. Independent IDEAL CT-index values for the same mixtures were obtained from the North Dakota Department of Transportation (NDDOT) for comparison. The results revealed that the mixtures with high reclaimed asphalt pavement (RAP) content were more susceptible to fatigue cracking, and exhibited low ductility, confirming RAP's stiffening effect on the asphalt mixtures. Ranking the mixtures using the Sapp and CT indices revealed that the asphalt binder type and RAP content played a key role in the asphalt mixtures' fatigue cracking performance.

43	Ashlyn Herron	Biology	Best bird for buck? Evaluating the influence of a grassland restoration program on bird diversity in North Dakota.
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Temperate grasslands are the most endangered and least protected ecosystem in the world, with agricultural conversion perpetuating continued loss. As a result, grassland avifauna have experienced the greatest population decline of all avian groups in North America since 1970. Grassland restoration can be used to reverse habitat loss; however, success has traditionally been measured by effort, not by ecological function. A large-scale restoration program in North Dakota began reseeding grasslands in 2022, creating an opportunity to assess outcomes in ecologically meaningful terms. Our research aims to determine if occupancy of grassland bird species increases on restored grasslands and on adjacent grasslands due to an increase in patch-size. To estimate avian occupancy, autonomous recording units were deployed on eleven properties across North Dakota in Spring 2023. Our results should provide an evaluation of the success of a grassland restoration program using avian responses as an ecological metric of return on investment.

44	Tiffany Chiu	Counseling Psychology	A Cultural Adaptation Process: Understanding Emotional Experiences of Asians and Asian Americans
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Emotional intelligence (EI) plays a pivotal role in recognizing emotions, problem-solving, and interpersonal understanding (Kitayama et al., 2006). However, prevalent EI assessments, primarily rooted in Western frameworks, may impose cultural biases when applied to marginalized populations (Triandis, 2015). This discrepancy underscores the imperative to adapt EI measures to ensure validity and reliability. The present study is aimed at culturally adapting the Brief Emotional Intelligence Scale-10 (BEIS-10) for Asian and Asian American communities.

To better understand the EI processes within Asian and Asian American groups in the United States, we administered a culturally adapted BEIS-10 to eleven participants (n=11) from targeted scholarly experts and community members with expertise in scale development in Asian and Asian American communities. The purpose of our study was to assess the content validity and acceptability of constructs, specifically appraisal, regulation, and utilization of emotions, of the culturally adapted items. ... (abstract truncated)

45	Piash Bhowmik	Mechanical Engineering	Exploring the Additive Compatibility and Tribological Behavior of Regular and High Oleic Soybean Oil
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As the demand for biobased lubricating oils continues to rise in the research arena, there is a growing focus on exploring diverse oil types. Particularly noteworthy is the surge in demand for high oleic oils, which offer enhanced stability and a richer oleic acid content compared to their raw counterparts. This study focused on examining the compatibility of both raw and high oleic soybean oils with different additives. It also assessed the performance of two distinct types of additives. Friction and wear tests were conducted to evaluate how well the additives performed when combined with the oils. The results revealed that antioxidant additives exhibited significantly better performance with raw soybean oil than with high oleic soybean oil. In terms of friction, ZDDP outperformed ZDDC, while the wear test outcomes were comparable. Scanning Electron Microscopy (SEM) and Energy-Dispersive X-ray Spectroscopy (EDS) analyses were conducted to comprehend the wear mechanism.

Poster	Presenter	Program	Abstract Title
46	Vladimir Zotov	Chemistry	Ring Opening Reduction of Cyclic Anhydrides Catalyzed by Tris(Pentafluorophenyl)Borane Using Hydrosilanes as Hydride Source

Hydrosilanes are widely used as reducing agents in reduction of carbonyl groups, and various catalysts have been developed for the activation of hydrosilanes, majority of them being transition metal-based. A main-group-based Lewis acid tris(pentafluorophenyl)borane (TPFPB) has gained increasing attention due to its Lewis acidity and versatility along with being non-metal. Herein we describe the TPFPB-catalyzed ring open reduction of cyclic anhydrides using hydrosilanes as a source of hydrides. The reduction takes a symmetrical ring and give an unsymmetrical bis(silyl) protected hydroxy-acid, leading to an efficient way for the synthesis of silyl ester functionalities. We used different tertiary silanes and cyclic anhydrides in order to study this reduction further to find 100% conversion, high yields, relatively fast reaction time and non-rigorous conditions. NMR spectroscopy is used in the confirmation of the formation of the products, along with insight to the potential mechanism.

47	Allyssa Baumbach	Educational Foundations & Research	Microaggressions and Faculty Motivation During the COVID-19 Pandemic: The Impact of Gender and Family Roles
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This study connects work, family, and faculty motivation through examination of microaggressions experienced by faculty during the COVID-19 pandemic and the extent faculty motivation for research was impacted by microaggressions. Self-determination Theory (Deci & Ryan, 1985) suggests basic psychological needs are positively related to motivation. Research on well-being also shows that being married is a positive contributor (Hsu & Barrett, 2020). Studies of university faculty indicate women are more likely to experience microaggressions and diminished motivation for research (Mardani & Stupnisky, 2023) and increased amotivation (Mardani et al., 2023). Studies also find that women are more likely to leave the academy for gender discrimination, inadequate workplace atmosphere (Hill et al., 2010), and family reasons than men (Spoon et al., 2023). This study hypothesizes women, parents, and unmarried people will experience more gendered microaggressions than their counterparts.

48	Boshra Besharatian	Civil Engineering	Benchmarking dynamic properties of structures using non-contact sensing
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Non-contact sensing can be a rapid and convenient alternative for determining structure response compared to conventional instrumentation. Computer vision has been broadly implemented to enable accurate non-contact structural dynamic response measurements. This study has analysed the effect of non-contact sensors, including type, frame rate, and data collection platform, on the performance of a novel motion detection technique. Video recordings of a free vibrating cantilever column were collected using a high-speed camera mounted on a tripod and an unmanned aerial system (UAS) equipped with visual and thermal sensors. Specimen acceleration data were collected using an accelerometer installed on the cantilever end. The displacement from each non-contact sensor and the acceleration from the contact sensor were analysed to measure the specimen's natural frequency and damping ratio. The specimen's first fundamental frequency and damping ratio results were validated by analysing acceleration data from the top of the specimen and a finite element model.

49	Teckla Njei	Chemistry	The exact wavefunction of interacting N degrees of freedom as a product of N single-degree-of-freedom wavefunctions
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Quantum systems with several coupled degrees of freedom have become a central interest in quantum mechanics (QM). This work addresses a different approach to the challenges of solving quantum systems with multiple coupled degrees of freedom such as molecules, clusters and solids. The proposed approach involves expressing the wavefunction (Ψ) for the entire system as a product of individual particle wavefunctions representing the exact solution of the Schrödinger equation (SE) for N coupled degrees of freedom (DOF), $\Psi(r_1, r_2, \dots, r_N) = \psi_1(r_1) \psi_2(r_2) \dots \psi_N(r_N)$. The key goals include deriving equations for these single-degree-of-freedom functions. This method is motivated by the Born-Oppenheimer (BO) approximation, with particular emphasis on the first function $\psi_1(r_1)$ as the eigenvalue is the exact energy and the density is an exact density of the full Hamiltonian (H).

Poster	Presenter	Program	Abstract Title
50	Topaza Yu	Counseling Psychology	Exploration of how Empathy, Intellectual Humility, and Self-Awareness Influence the Perceived Levels of Cultural Humility in Black, Indigenous, and People of Color (BIPOC) Health Service Psychology (HSP) Trainees.

The study explores the effect of empathy, intellectual humility, and self-awareness on the perceived levels of cultural humility of BIPOC HSP trainees, with their racial identity as a potential moderating factor. Literature highlights the importance of cultural humility in providing culturally sensitive care, yet there's a research gap on how these traits influence it among BIPOC HSP trainees. The proposed online quantitative survey will utilize the Perth Empathy Scale, Comprehensive Intellectual Humility Scale, Self-Awareness Outcomes Questionnaire, the Multidimensional Cultural Humility Scale, and the People of Color Racial Identity Attitudes Scale to investigate these relationships. Cluster analysis and hierarchical regression analysis will be used for data analysis. Participants will be over 18, identifies as BIPOC, enrolled in HSP programs in the U.S., and recruited via social media and snowball sampling. The study hypothesizes a positive relationship between empathy, intellectual humility, self-awareness, and cultural humility, with racial identity moderating this relationship.

51	Tabish	Civil Engineering	Buckling Prediction of Stiffened Cylindrical Shells Through the Integration of Finite Element and Machine Learning Techniques
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Stiffened cylindrical shell buckling strength mainly depends on the unstiffened geometric and stiffener properties. A detailed parametric study was conducted to investigate the influence of these properties on the stiffened cylindrical shell buckling strength. The proposed framework involves an integration of finite element method and various machine learning (ML) techniques. The dataset was obtained from the eigenvalue buckling analysis of 350 numerical simulations using ANSYS workbench. Datasets were trained (80%) and tested (20%) with various simple to complex ML algorithms. The predicted buckling strength obtained from each ML technique was compared to the numerical buckling strength. Artificial neural networks (ANN) performed excellently. Random forest and polynomial regression give better results while KNN and linear regression models are the least performing models for this study. ANN model performs well for new data within the range of the training dataset; however, ANN model is unable to learn underlying patterns for outside range of the training dataset and model extrapolation performance deteriorates when dealing with full-scale dimensions.

52	Darius NK Quansah	Biomedical Sciences	Endolysosome iron chelation rescues amyloid beta-induced mitochondrial damage and ferroptosis via regulation of SLC7A11-dependent mechanisms
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Amyloid-beta ($A\beta$) proteins and ferrous iron (Fe^{2+}) have been implicated in the pathogenesis of Alzheimer's disease (AD). $A\beta$ and Fe^{2+} increase oxidative damage to neurons through the generation of reactive oxygen species (ROS) and activation of the reactive species interactome. Mitochondria are particularly susceptible to oxidative damage, mitochondrial redox catastrophe, and bioenergetic crisis, which results in cell death by ferroptosis. Endolysosomes contain large concentrations of readily releasable Fe^{2+} and endolysosome de-acidification results in increased levels of cytosolic and mitochondrial Fe^{2+} and ROS, and cell death. Here, we showed that $A\beta_{1-42}$ protein (1) trafficked into endolysosomes and decreased endolysosome Fe^{2+} levels, (2) increased levels of mitochondrial Fe^{2+} and ROS, (3) increased cellular levels of lipid peroxidation, and (4) decreased cellular levels of the anti-ferroptosis protein SLC7A11; effects all blocked by the endocytosed iron-chelator deferrioxamine. Thus, endolysosome iron stores may play a particularly important role in AD pathogenesis.

53	Talia Vazquez	Teaching & Leadership	Creating A Supportive Classroom Community
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The purpose of this project was to create a resource for teachers to use that compiles a variety of methods for building supportive classroom communities following the three main categories established by the Collaboration for Academic, Social, and Emotional Learning (CASEL). The three classroom community categories are community building, belonging and emotional safety, and student-centered learning. Students need supportive classroom communities to thrive socially, emotionally, and academically, which makes it important for teachers to have a variety of methods for building this community. This resource provides teachers with nine different methods for creating an uplifting classroom community where all students feel safe and supported.

Poster	Presenter	Program	Abstract Title
54	Katerina Litvanova	Chemical Engineering	Gaseous Thermal Decomposition Products of Significant Per- and Polyfluoroalkyl Substances (PFAS) Investigated by an Innovative Analytical Method

We are presenting a novel two-step method for analysis and breakdown of widespread emerging environmental pollutants, PFAS and their breakdown products. The first step, evolved gas analysis mass spectrometry (EGA-MS) is fast scouting method, allowing to obtain profiles of structural fragments and ions in real-time in a wide temperature range obtaining significant temperatures and important ions. EGA-MS results were used to design the second step: thermal desorption pyrolysis gas chromatography with mass spectrometry (TD-Py-GC-MS). This step allows compound separation, providing detailed identification. Proof of concept was performed with perfluorooctanoic acid, and the method was validated using other PFAS. Our method shows a comprehensive understanding of PFAS degradation including the breakdown products within one instrument and could be used as a standard method for analysis of PFAS in environmental samples and less studied PFAS.

55	Thomas Iken	Physics	Investigation of Chromium (III) Sulfide's Thermal Resistance using Scanning Thermal Microscopy
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The conversion efficiency of thermoelectric material is based on the dimensionless figure of merit zT , defined by $zT = (S^2 \sigma T) / \kappa$, where S , σ , κ are defined as the Seebeck coefficient, electrical conductivity, and thermal conductivity, respectively. One of the ways to increase zT is to reduce the thermal conductivity. The nanostructuring of a thermoelectric material increases phonon scattering at the grain boundaries and therefore lowers thermal conductance. In this study, we use an extension of atomic force microscopy (AFM) – scanning thermal microscopy (SThM) – to measure the thermal resistance, related to the thermal conductivity, of chromium (III) sulfide (Cr₂S₃) nanoparticles. The data shows an inverse linear relationship between the recorded probe resistance values as a function of particle height at a constant radius and a logarithmic relationship between probe resistance values and the radius of a particle at a constant height. These relationships were explained through the Fourier law of heat conduction.

56	Charles Grolla	Educational Practice & Leadership	Culturally Responsive Curriculum for Ojibwe students
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This literature review presents relevant research concerning culturally responsive curriculum for implementation with Native American students. Culturally responsive curriculum positively impacts students by honoring Native American and Indigenous peoples. After summarizing traditional Ojibwe education and Native Americans' dark history with the education system, which created historical trauma for Native Americans, this review outlines culturally responsive curriculum, shown to improve Native American students' school attendance, test scores, and relationships with staff and school system. Community partnerships are paramount to success in schools' decision-making about policy and programs. Restorative practices, circle process, mentorship, role models, trust between Native students and non-Native teachers, and celebration of Native students' culture and history are described. A main cultural component, Indigenous language should be a focus of cultural responsiveness in classroom and school initiatives. Teacher characteristics associated with Native student success are outlined, as well as recommendations for how best to embrace culturally responsive curriculum.

57	Achouak Benarbia	Energy Engineering	Characterization and Wear Resistance Analysis of Thrust Pin and Insert in High-Speed Drilling Motors
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This study addresses critical wear-related challenges in the oil and gas industry, focusing on enhancing the wear resistance of thrust pins and inserts in high-speed drilling motors. Employing chemical analysis, hardness assessments, and metallographic examinations, it identifies materials and microstructures of these components. Results highlight the superior wear resistance of the AISI 9314 thrust pin over the AISI 9310 insert. Utilizing innovative techniques such as pin-on-disc tribometer and microscopy, the study unveils wear patterns and surface degradation. It also explores prospective surface treatments, particularly carburizing, for material optimization. These findings not only promise to bolster mechanical system performance but also pave the way for significant economic and technological progress within the oil and gas sector. Furthermore, the study's focus on optimizing energy systems and reducing the carbon footprint aligns with broader sustainability goals, indicating potential environmental benefits alongside industrial advancements.

Poster	Presenter	Program	Abstract Title
58	Dawn Cleveland	Biomedical Sciences	Pathology of novel causative agent of Lyme disease in Upper Midwest, <i>Borrelia mayonii</i> , in the murine model of Lyme disease

Ticks carry a plethora of pathogens that cause disease in humans, with perhaps the most prevalent being bacteria in the genus *Borrelia*, referred to as spirochetes due to their unique spiral morphology. *Borrelia burgdorferi*, the causative agent Lyme disease, leads to persistent inflammation affecting the joints (arthritis), heart (carditis), and nervous system (Lyme neuroborreliosis). These symptoms can be recapitulated in a laboratory mouse model, allowing researchers to better understand Lyme disease pathology. *Borrelia mayonii* is a newly recognized causative agent of Lyme disease in the Upper Midwestern United States. Patient illness caused by *B. mayonii*, compared with classical Lyme disease, had several clinical features not typically associated with Lyme disease, particularly high levels of spirochetes in the blood (spirochetemia). The goal of this study is to use the Lyme disease mouse model to investigate pathology of *B. mayonii*, both classic symptoms (arthritis, carditis) and non-classic (high spirochetemia).

59	India Stockert	Counseling Psychology	Gender Differences in Emotion Regulation and how it Relates to Emotional Reactivity
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Emotion regulation is described as the processes that individuals use to control their emotional state; this may involve behaviors or coping skills that reduce anger or anxiety or focusing on positive subjects to remain calm. The current study aims to look at gender differences in both cognitive reappraisal and expressive suppression in a general population. We will address issues of intrapersonal emotion regulation strategies and gender differences in the use of interpersonal emotion regulation as well. The project will propose a study that utilizes quantitative methodology via an online survey which will ask participants to answer questions and complete the Emotion Regulation Questionnaire (ERQ) as well as the Interpersonal Emotion Regulation Questionnaire (IERQ). The proposed project presents a major step in proposing how to look at gender differences in emotion regulation and how that relates to emotional reactivity.

60	Raja Abubakar Khalid	Civil Engineering	Performance evaluation of recycled polyethylene-modified asphalt binder
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Over half of the plastic produced worldwide is not recycled and has been a serious environmental concern for the last three decades. This study investigates the effect of waste plastics on the physical and rheological properties of asphalt binder used in North Dakota. Linear Amplitude Sweep (LAS) and Multiple Sweep Creep Recovery (MSCR) tests were used to evaluate fatigue cracking and rutting resistance, respectively. A shredded blend of High-Density polyethylene (HDPE) and Light-Density polyethylene (LDPE) obtained from grocery bag recycling was used to modify PG 58S-34 and PG 58-28 binders using the wet method. The plastic has been replaced in proportions of 0%, 1.5%, 3%, 4.5%, and 6% by weight of the PG 58S-34 binder. The results indicate significant improvement in the modified binder rutting resistance allowing extreme heavy traffic loading. The fatigue cracking resistance didn't improve with plastic addition.

61	Jacob Haugen	Biomedical Sciences	Understanding Histone Modification Dynamics Using SV40 and Their Effects on Early Transcription
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SV40 continues to be an important tool in understanding eukaryotic transcription. It experiences similar processes as cellular chromatin, utilizing host proteins to propagate its own growth. This hijacking includes using host histone modifying enzymes to modify its own histones. In this study, we use inhibitors for these modifying enzymes to observe the effects on normal conditions. Utilizing ChIP to measure modified histones, we are able to demonstrate the decrease or increase of histone modifications. Furthermore, we analyzed the RNA product for the production of T antigen (Tag). We saw that when you modify one modification the others change as well. This indicates that histone modifications are much more dynamic than previously thought. The RNA product also changes depending on these modifications. Depending on the modification there seems to be an increase or decrease in Tag as well as a difference in the splicing of the protein.

62	Shakila Parvin Bristy	Psychology	Crossmodal Communication in Perceptual Discrimination: A Behavioral Study on Visual and Tactile Modalities
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The study investigated crossmodal communication in perceptual discrimination between visual and tactile modalities among 32 children aged 7-11 in Dhaka, Bangladesh. Two experiments were conducted in two phases, "tactile to visual" (Phase 1), and "visual to tactile" (Phase 2) phases. We assessed the correctness of response (CRP) and reaction time (RT) for discriminating unknown Japanese letters and geometric shapes. Data were analyzed in t-tests, and one-way repeated measures ANOVAs using visual field location or tactile space as a within-subjects factor. Results revealed that in both phases, the average CRP was significantly different from zero in all the visual field locations or tactile spaces. Moreover, CRP was significantly higher in Phase 1 than in Phase 2 with a shorter reaction time. Children performed better in identifying letters and geometric shapes when experienced the stimuli tactilely and tested visually, with a better performance in geometric shape discrimination compared to Japanese letter discrimination.

Poster	Presenter	Program	Abstract Title
63	Friday Ebere	Petroleum Engineering	Geochemical Characterization and Implications for Underground Hydrogen Storage: A Case Study in North Dakota's Geological Formation

This study investigates the geochemical interactions between hydrogen gas, geological formations and microbial processes for underground hydrogen storage, aiming to address existing knowledge gaps. Focusing on North Dakota's geological composition, thirty-seven core samples from four wells undergo analysis to discern the dynamics between hydrogen, brine, and rock. Water analysis reveals significant amounts of sodium, chloride, carbonate, bicarbonate, and sulfate present. X-ray diffraction (XRD) identifies calcium carbonate as the dominant mineral phase in one sample, constituting 60.3% of its composition, corroborated by X-ray fluorescence (XRF) showing a CaO content of 93.2%. These findings underscore the feasibility of utilizing depleted oil and gas reservoirs for hydrogen storage in North Dakota. Moreover, the research sheds light on potential environmental implications, contributing to the advancement of sustainable energy solutions amidst the global transition towards renewable energy sources.

64	Christian Abosede	Biomedical Sciences	Understanding How Nuclear Response to Mechanical Cues Regulates Muscle Stem Cell
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Stem cells rely on their microenvironment for signals, including changes in mechanical stimuli like muscle contraction, which impacts their cellular state. The nucleus, through the nuclear membrane complex, translates these external forces into gene expression. Mutations of proteins within this complex are linked to muscular dystrophies and progeria. In this study, we disrupted Syne 2 function using a mutant lacking the KASH domain (Syne2cpfl8^{-/-}) that can allow Syne2 to localize into the nucleus. This led to increased Pax7, a marker of stem cell quiescence, suggesting a deeper quiescent state. Additionally, reduced metabolism, marked by phosphorylated S6, and an altered heterochromatin state were observed. Interestingly, a mouse model of Hutchinson-Gilford Progeria Syndrome (LMNA^{prog/-}), harboring a mutant lamin protein, exhibited a loss of stem cell quiescence and increased metabolism. This study hopes to investigate the interplay between this nuclear mechanotransduction and stem cell function in associated disorders and potentially aging.

65	Molly Hacker	Counseling Psychology	Self-Stigma of Mental Illness Amongst Medical Students: A Scoping Review Protocol
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This presentation describes the development of a scoping review protocol to examine the literature concerning mental illness self-stigma among medical students. This scoping review is currently in progress and aims to identify and summarize the extant quantitative research findings about this phenomenon. Self-stigma of mental illness has been strongly correlated with lower levels of willingness and intention to seek professional help, potentially prolonging and exacerbating mental health issues (Wang et al., 2023). However, most research examines stigma from medical students towards patients rather than towards themselves. Medical students and physicians may be particularly susceptible to the negative outcomes of mental illness self-stigma due to the rigor and culture of medical training (Chew-Graham et al., 2003). Therefore, the present scoping review is being undertaken to summarize extant findings, identify gaps in understanding, and inform further research, including intervention design.

66	Shafqat Ullah	Civil Engineering	Numerical Investigation on Buckling Response of Thin-Walled Steel Cylindrical Liquefied Natural Gas (LNG) Storage Tanks (TWSC LNGST) under Earthquake Loading
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Nowadays, the liquefied natural gas (LNG) has long been considering the alternative of the petroleum fuel and the report [AEO 2006] indicates that in the US, the consumption of natural gas will increase from 635 billion m³ in 2004 to 762 billion m³ in 2030. The seismic response of TWSC LNGST is of great importance to ensure the safety and economy of the large scale-diameter of the LNG tanks. This study investigates the dynamic buckling response of TWSC LNGST under earthquake loading. The first part of this study focused on the seismic design comparisons of the tank using API 650, EC8 and NZSEE design provision followed by the evaluating dynamic response of the prototype (test model) tank's FE analysis using commercial software ABAQUS. The impulsive and convective vibration periods, sloshing and hydrodynamic stresses of the analyzed tank subjected to earthquake loading are investigated. The FE results are in good agreement with that of the test results.

Poster	Presenter	Program	Abstract Title
67	Caleb Strom	Space Studies	Evaluation of Age and Rheology as Causes of the Morphological Distinctiveness of Ahuna Mons on Ceres

The water-rich asteroid belt object (1) Ceres has evidence of recent cryovolcanic activity on its surface in the form of the dome-shaped mountain, Ahuna Mons. Ahuna Mons is the only feature that distinctly resembles a volcanic dome on Ceres. Other candidate cryovolcanic domes on Ceres appear significantly more degraded, suggesting that they are ice-rich enough to viscously relax over time. I use a correlative study of dome crater-counting age and dome aspect (height/basal diameter) ratio to investigate two hypotheses for why Ahuna Mons has not viscously relaxed like the other candidate domes, 1) Ahuna Mons is too young and 2) Ahuna Mons is less ice-rich and therefore less prone to viscous relaxation. My results show no correlation between age and aspect ratio, suggesting that hypothesis 2 is more likely, which has implications for how much water is contained in Ceres.

68	Crystal Lundmark	Counseling Psychology	Exploration of Perceived Accessibility of Healthcare for People with Disabilities in Rural Areas
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There are many barriers and disparities experienced by people with disabilities when seeking health care services in rural areas. Accessibility, or the ability to obtain relevant and appropriate services, is one such barrier. Lack of accessibility is a common problem and there are many components of this, especially for people with disabilities. This research will utilize a mixed methods approach to identifying the largest barriers to healthcare accessibility experienced by people with disabilities in rural vs urban environments and how these barriers impact their well-being. The comparison between the two settings (urban vs. rural) will help identify potential unique needs and limitations to accessibility experienced by rural disabled people. The findings from this research will provide a framework for understanding rural people with disabilities and the ways to make healthcare more accessible for all.

69	Eberechi Ichi	Civil Engineering	A novel technique for detecting and quantifying fouling contamination in railroad ballasts
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The United States freight network covers almost 140,000 route miles, providing over 167,000 jobs and other benefits, including reductions in road congestion, highway accidents and fatalities, fuel consumption, greenhouse gases, logistics costs, and public infrastructure maintenance costs. Railroad infrastructure is deteriorating alarmingly, making inspection, maintenance, and repair a significant subject matter in recent years. Ballast contamination, known as fouling, is a significant challenge that causes railway track deterioration and failure. Traditional inspections are plagued by drawbacks, such as inefficiency, alteration of existing structures, traffic disruptions, safety concerns, and unreliable inspection outcomes. Therefore, our study aims to develop a methodology for an accurate noncontact assessment of the track's conditions. We adopted an advanced sensor, Hyperspectral imagery (HSI), for data collection of dry-fouled and wet-fouled ballast. The data were preprocessed and analyzed to determine the presence and amount of contamination in the ballast using regression models. Results show prospects and high R2 predictability values of fouling and moisture presence.

70	Jill Baird	Teaching & Leadership	Cross-Curricular Learning: A Comprehensive Review of Digital Literacy and Social Emotional Learning
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This comprehensive literature review will explore the connections between digital literacy and social emotional learning for students and how they have been approached together within previous studies. The goal is to achieve a better understanding within these two focal areas of scholarship as we move forward in an ever-increasing digital landscape of education.

71	Goshen Miteu	Biomedical Sciences	Determining Respiratory Syncytial Virus-induced epigenetic modulations in the lung (in vitro)
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Respiratory Syncytial Virus (RSV) is associated with bronchiolitis, affecting children and adults. The mechanisms by which RSV may induce epigenetic modulations, contributing to the progression of asthma, is not yet known. We hypothesize that RSV infection induces epigenetic changes in host lung airway cells that may contribute to asthma progression by altering gene expression patterns associated with immune and inflammatory responses. To determine RSV-driven chromatin remodeling, we infected primary normal human bronchial epithelial (NHBE) cells (different donors: healthy adult, healthy infant, or adult with chronic condition, e.g., asthma) in monolayer (2D culture) or in airway epithelium (3D culture). We have optimized a protocol for sample preparation for the assay for transposase-accessible next-generation sequencing (ATAC-seq) to investigate transcriptionally active open chromatin domains and their contributions to RSV-induced asthma progression. Our findings may provide rationale and pave the way for developing novel therapies against RSV-driven asthma progression.

Poster	Presenter	Program	Abstract Title
72	Christine Litzinger	Educational Foundations & Research	Early Qualitative Interview findings on a year one Science of Reading Implementation

The Science of Reading is a body of research that informs best reading instruction practices. Across the country, there have been debates and grassroots efforts to change reading instruction methods to align with research in the Science of Reading. These grassroots efforts have often been led by families of children with reading difficulties such as dyslexia. The ability to read is critical for the future success of students, not just in academics, but in life. This study explores a year-one implementation of Science of Reading curriculum in the Grand Forks Public School district. The qualitative aspect of this study utilizes semi-structured phenomenological interviews with literacy specialists and K-3 classroom teachers to learn more about their experience and their classroom observations of student experiences with the new curriculum and the implementation process.

73	Faisal Ahmed	Environmental Engineering	Adsorption of Ciprofloxacin and Ibuprofen on Magnetic Iron-doped Powdered Activated Carbon
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Pharmaceutical contamination in water systems can have potential adverse effects on entire ecosystems and public health. Pharmaceuticals such as Ciprofloxacin (CIP) and Ibuprofen (IBU) are primarily derived from hospitals and household sources. These substances are not fully removed during wastewater treatment, contributing to their increasing presence in surface water. Among the various destructive and nondestructive technologies, the adsorption process stands out as a cost-effective and efficient technology for removing organic contaminants from wastewater. Therefore, the aim of this study is to investigate the adsorption efficiency of CIP and IBU on pristine and magnetic iron-doped powdered activated carbon (PAC), with fast agglomeration and settling properties. The main objectives of this study are to investigate the impact of (i) adsorbent properties, including surface area, pore volume, and (ii) physicochemical properties such as molecular weight and acidity constant on the CIP and IBU adsorption of pristine and magnetic iron-doped PAC.

74	Matthew Johnston	Biomedical Sciences	Skeletal Muscle Maintenance of Long-Lived Dwarf Mice
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Ames dwarf mice live 50% longer than control littermates due to a genetic defect in growth hormone (GH) signaling. An unexplored organ system of this model is skeletal muscle (SM). Here we compare SM function, morphology, and maintenance in Ames dwarf mice against age-matched normal controls across young, middle, and aged groups. SM function was evaluated by having mice perform grip strength, rotarod, and endurance running experiments over 6 months. Dwarf mice show improved scores in relative grip strength, walking gait, and endurance running times. Proposed mechanisms behind increased function include improved oxidative and regenerative capacity. Histological analysis was conducted via H&E and laminin staining. Dwarf mice show healthy nucleation yet considerably smaller average cross-sectional area than wildtypes - unsurprising due to their dwarfism. Utilizing a longevity model to study SM function and maintenance is a novel approach to gain insight into the seemingly inverse relationship between GH signaling and mammalian longevity.

75	Drew Lenway	Counseling Psychology	The Role of Supervisory Style and Self-Efficacy in Novice Clinical Supervisors
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Friedlander and Ward's supervisory style (SS) model, comprising attractiveness, interpersonal sensitivity, and task-orientation (1984), has been extensively studied in relation to supervisee outcomes. However, limited research explores novice supervisors' perceptions of their supervisory style, a crucial aspect for their development. This proposed independent study aims to address this gap by recruiting novice supervisors and assessing their SS and self-efficacy across its subcomponents. The proposed study will employ online surveys, using the Supervisory Style Inventory (Friedlander and Ward, 1984), Supervision Evaluation and Supervisory Competency scale (Gonsalvez, 2021), and Counselor Supervisor Self-Efficacy Scale (Barnes, 2002). Participants will include graduate students and early career professionals in counseling, counseling psychology, and clinical psychology providing clinical supervision. It is hypothesized that novice supervisors will score higher on attractiveness and interpersonal sensitivity than task orientation, and a negative correlation will exist between their self-efficacy and task orientation.

Poster	Presenter	Program	Abstract Title
76	Lawrence Anyim	Energy Engineering	Life Cycle Assessment of Biogas Co-firing with Carbon Capture and Storage

Bioenergy with carbon capture and storage is a renewable power generation strategy that has the potential to achieve negative CO₂ emissions. Due to variability of bioenergy availability across power generation locations, the integration of non-renewable resources becomes necessary. One promising solution lies in co-firing waste coal with biogas and using carbon capture and storage. The benefit of this approach is that it also presents a remediation pathway aimed at reducing waste coal quantities and providing greenhouse gas mitigation strategies. This study uses life cycle assessment to investigate the environmental impacts of the co-firing solution, utilizing biogas sourced from different feedstocks. The results indicated that by replacing approximately 30wt% of the coal with biogas from landfills and capturing 90% of the CO₂, the power plant's emissions could be lowered by up to 1.3 tonnes CO₂eq/MWh.

77	JamesGuy Gierisch	Geography	Analyzing the Effects of Land Use, Land Cover, and Infrastructure on Water Quality Standards Within the Itasca and St. Louis Moraine Region of Minnesota
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The river and lake systems in the United States are essential to commerce and human existence. This study of the water quality of the upper Mississippi River watershed was conducted within Itasca State Park, Minnesota. My research focused on ten lakes within the perimeter and backcountry parts of the State Park. Water samples were collected from July 2022 through May 2023. During their collection, the lakes were analyzed for temperature, pH, dissolved oxygen, and specific conductance. The samples were then analyzed for a series of ions, such as chloride, and nutrients, such as orthophosphate. This data, in addition to satellite land cover data, was used to answer questions regarding, water quality variations, nutrient variations based on location and distance from points of interest, and the correlations between these factors and the satellite imagery. The study found that trail length and proximity to lakes could be connected to water quality.

78	Olivia Rajpathy	Public Health	Analyzing Artificial Intelligence and Predictive Analytics, within Medicaid and Medicare for Improved Decision-Making and Efficiency
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Background: By leveraging algorithms and machine learning, artificial intelligence (AI) and predictive analytics can assist healthcare providers in detecting diseases earlier, predicting patient outcomes, optimizing treatment plans, and enhancing overall healthcare delivery. Methods: Policy analysis of AI integration and use in Centers for Medicare and Medicaid Services (CMS) to identify potential policy options to improve health outcomes with the use of AI using CDC's POLARIS. Discussion: Regulatory agencies such as CMS have started exploring ways to incorporate AI and Predictive Analytics into their reimbursement models, including the creation of specific billing codes and reimbursement mechanisms for AI-enabled healthcare services. Proposed Deliverables: Identify possible policy options with a literature review, environmental scan, and surveys of best practice. Describe the policy impact on health including the cost of implementation, and feasibility. Conclusion: Best policy options will be recommended for use in CMS for AI facilitated diagnosis and treatments for improved health outcomes.

79	Mousa Almousa	Civil Engineering	Arsenate Removal from North Dakota Well Water: Titanium with MOF (UiO-66) Impregnated Carbon Blocks
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Elevated exposure to arsenic disproportionately affects populations relying on private well water in North Dakota, USA, especially in American Indian communities. They are at a higher risk of arsenic exposure due to their use of private well water. The arsenic levels exceed the EPA's safety threshold of 10 µg/L. Arsenic contamination is a global threat due to its toxicity and carcinogenicity and is a top-priority hazardous substance as it causes several health problems such as liver, lung, kidney, and skin cancers. Our study aims to address this issue by investigating the effectiveness of the Point-of-use (POU) carbon block filter treatment systems. Specifically, it will explore the potential of impregnating carbon blocks with amorphous titanium (hydr)oxide (THO) fabricated with MOF (UiO-66) (metal-organic framework) to enhance arsenic removal from private well water without introducing titanium (Ti) and MOF into the treated water.

Poster	Presenter	Program	Abstract Title
80	Grace Taiwo	Energy Engineering	Evaluation of Hydrogen Storage Potential in Depleted Hydrocarbon Formations: A Case Study of the middle Bakken member in the Antelope Field, Williston Basin

Hydrogen offers immense potential as a low-emission fuel as decarbonization intensifies globally and viable storage options are a prerequisite to steady the fluctuating nature of renewables. In North Dakota, most of the Bakken wells are nearing depletion making them potential candidates for hydrogen storage. Repurposing these wells for storage could transform abandoned wells and fossil fuel infrastructure into a vital asset for renewable expansion. This research focuses on assessing the feasibility of storing hydrogen in the depleted reservoirs within the Bakken's middle member beneath the Antelope oil field. Utilizing qualitative (rock characterization) and quantitative (modeling) methods, rock properties, hydrogen injection rates, withdrawal rates, and storage capacities are estimated. Positive technical outcomes such as confirming Bakken reservoirs' feasibility for subsurface hydrogen containment, would mark a significant operational transition. Expanding North Dakota's subterranean hydrogen capacity pioneers practices to enable broader hydrogen storage globally while offering the state economic prospects.

81	Jessica Van Bree	Psychology	Examining the Effects of tDCS on Visuomotor Integration & Processing
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Transcranial direct current stimulation (tDCS) has been found to facilitate visuomotor learning, motion processing, and the coordination and accuracy of motor movement. Previous studies have demonstrated that longitudinal training of oculomotor, visual, attentional, and motor skills can produce significant improvements of visuomotor integration and control in healthy participants (Antal et al., 2004; Coffmann et al., 2014). As such, tDCS may be an appropriate addition to the rehabilitation of clinical populations or the improvement of athletic performance. The current study aimed to investigate the effectiveness of tDCS on visuomotor processing. The study included behavioral and psychophysiological assessment of various aspects of visual processing and visuomotor control. The results indicated that some participants had minor improvements in their contrast sensitivity, near-far quickness, and perception span skills, in addition to more efficient visual processing. However, there were no significant differences in mu suppression from pre- to post-assessment.

82	Njiru Mwaura	Civil Engineering	Buckling Strength and Ductility Evaluation of Thin-Walled Steel Tubular Columns Under Cyclic Lateral Loading
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Thin-walled steel tubular columns with stiffened circular or square cross sections are widely used as cantilever piers in bridges due to their excellent structural and constructional advantages. However, local buckling, global buckling, or the interaction between both is usually the main reason for significant strength reduction in these columns, which eventually leads to their collapse. This study investigates the behavior of thin-walled steel tubular columns with conventional prismatic circular and square sections under combined constant axial and cyclic lateral loading. The analysis is carried out using a finite-element model (FEM) which considers both material and geometric non-linearities. First, the accuracy of the employed FEM is substantiated using the experimental data available in the literature. Then, an extensive parametric study is carried out to investigate the effects of various important parameters such as radius-to-thickness ratio (R/t), column slenderness ratio (λ), magnitude of axial load (P/P_y), and number of loading cycles (N) on the strength and ductility of the columns. Finally, design formulas for strength and ductility evaluation of the columns are proposed.

83	Mohammed Alsaadi	Earth System Science & Policy	Study the social, environmental, and economical feasibility of using Community Solar Garden to engage communities with the National Renewable Energy Program (NREP) in Saudi Arabia
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Saudi Arabia is a country that has been known as an oil and gas (fossil fuels) country for decades. Part of the fossil fuel consumed locally to generate electricity. This consumption causes issues that impacted environment, society and economy negatively. In 2017, the Saudi Ministry of Energy started the National Renewable Energy Program (NREP) to shift the country from using fossil fuel to use renewable energy. This program aims to generate 50% of electricity by using renewable energy especially solar by the year 2030. The Saudi government focuses on building mega-projects of solar farms (PV). But these projects are outside cities and far from people's sight and attention which makes the NREP missing the value of engaging people with government's plan. Therefore, this research introduces a solution which is the Community Solar Garden (CSG), and highlights the social, environmental, and economical benefits of using CSG to engage communities with NREP.

Poster	Presenter	Program	Abstract Title
84	Kavindi Madduma Hewage	Physics	Elucidating the Dynamic Interactions of <i>Borrelia burgdorferi</i> Surface Proteins with Fibronectin using Atomic Force Microscopy

Lyme disease is the leading vector-borne disease in the United States, caused by the bacterium *Borrelia burgdorferi*. Previous studies have shown that the bacterium's outer surface proteins facilitate adhesion to host cells, which is the first step in bacterial infection. Our research investigates the adhesive properties of six specific surface proteins—RevA, BmpA, OspA, Fla, OspC, and BBK32 —by examining their interaction with the human protein Fibronectin at the single-molecule level. By coating dishes with these proteins, we explored the interactions between Fibronectin and specific surface proteins using Atomic Force Microscopy equipped with functionalized cantilever tips, which is Dynamic Force Spectroscopy. Our study uniquely quantifies the dynamic force interactions of these adhesins at varying loading rates. This approach aims to elucidate the role of these surface proteins in the pathogenesis of Lyme disease, providing insights into their mechanisms of action and potential implications for therapeutic intervention.

85	Zhongling Zhang	Music	Women's Choirs: Empowering Spaces for Women
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The literature review explores empowering spaces in the context of music education, focusing on women's choirs as a unique manifestation. Empowering spaces, characterized by belonging and independence, aim to address societal harm inflicted upon marginalized groups. The "women's space" concept reveals gender biases in public and workplace settings. While gender stereotypes persist in music education, all-female choirs emerge as idealized empowering spaces. Despite statistical data indicating a majority of female choir members, subtle inequalities persist due to the scarcity of male participants, influencing standards and opportunities for women. Nevertheless, all-female choirs offer an idealized environment for women, fostering inclusivity and empowerment.

86	Sina Ibne Ahmed	Electrical Engineering	Reliability Analysis of Regression-Based Hybrid Machine Learning Model for the Prediction of Electric Power Generation by Solar Photovoltaics in North Dakota
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Solar Photovoltaics (PVs) have become widespread as micro-distributed electric power generators in urban residential and commercial areas due to their affordability and minimal maintenance requirements. Despite these advantages, PV generation is intermittent, necessitating the implementation of robust predictive algorithms to capture power generation trends effectively. However, the performance of the predictive models may also fluctuate over time, necessitating a reliability assessment of their performance. This study has applied multivariate adaptive regression spline (MARS)-based hybrid machine learning models to predict the hourly PV power generation for a week in three urban areas of North Dakota. The performance of the models has been recorded over a year, and a probability distribution-based reliability model has been proposed to demonstrate the hybrid algorithm's effectiveness.

87	Michael Lant	Biology	A Quantitative Approach to Assess Sportsperson Participation
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A lack of funding is the primary concern for meeting current conservation challenges. Conservation efforts are primarily facilitated and supported by large non-governmental organizations and state natural resource agencies that depend on voluntary contributions (i.e., license sales, memberships or donations) from conservationists. However, we know very little about conservation contributions to adequately forecast and inform natural resource management. Nationwide declines in recreational fishing and hunting license sales have prompted the investigation of heterogeneity among conservationists and their contributions (via license sales) to natural resource management. We used the North Dakota recreational fishery as a model system to investigate heterogeneity among resident angler conservationists. Our objective was to identify North Dakota angler subgroups, hereafter referred to as typologies, that exhibit shared license purchasing histories and thus conservation contributions. Angler license typologies were constructed using 2009-2019 data from North Dakota Game and Fish Department's angler license sale database. ... (abstract truncated)

Poster	Presenter	Program	Abstract Title
88	Kamryn Holtz	Counseling Psychology	Elementary GSA Save Lives: A Group Model to Decrease Health Disparities and Mental Health Outcomes & Positively impact Educational Outcomes

A record number of 504 anti-LGBTQ bills were proposed nationally during the 2023 legislative session, with 84 of these bills being passed into law. With the rise of anti-LGBTQ+ legislation and rhetoric in the state, it is predicted that LGBTQ+ youth will experience an increase in mental health concerns, such as depressive symptoms, suicidality, and substance use. Schools have a unique opportunity to support LGBTQ+ students through the use of affirming practices and school programming, such as Gender-Sexuality Alliances (GSA), which could serve as an early intervention in decreasing health disparities and mental health concerns and positively impacting educational outcomes. This poster will explore the need, theoretical framework, structure, and potential barriers to the implementation of elementary-level GSAs and affirming practices, as well as propose a Group model to decrease health disparities and mental health concerns and positively impact educational outcomes for all North Dakota elementary school-aged youth.

89	Faezeh Jafari	Civil Engineering	Image-based stockpile inventory management using Unmanned Aerial Systems
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Monitoring a stockpile's volume is essential for managing storage, sales, and organization. Various technologies, such as Total Stations (TST), Light Detection and Ranging (LiDAR), and Global Positioning Systems, have been used to obtain stockpile volumes; however, stakeholders, such as state Departments of Transportation, seek to find a faster, safer way to obtain an object's volume with minimal workforce training. Unmanned Aircraft Systems (UASs) are a new technology that have the ability to obtain measurements; however, this potential has not yet been fully explored. UASs may be used to obtain an object's area and volume; however, the effect of Ground Sampling Distance (GSD) on measurement accuracy has not yet been investigated. To do this, first, we conducted a series of tests to establish if a stockpile volume can be determined using UAS and Pix4D software. The Pix4D output was verified with MATLAB in terms of GSD values and stockpile volume. ... (abstract truncated)

90	Nafisa Bala	Chemistry	Applicability of Thermal Desorption-Pyrolysis Gas Chromatography and Mass Spectrometry for Wood Aging Study
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In our study, the versatility of the thermal desorption-pyrolysis (TD-Py) sample introduction technique together with the separation and identification power of gas chromatography and mass spectrometry (GC-MS) were utilized to develop a TD-Py-GC-MS method to investigate aging in window-treated corner sections. This method allowed for the quantitative determination of fungicides and the characterization of wood constituents in aged wood samples. The mass spectrometer was utilized by using a simultaneous scan and selected ion monitoring (SIM) which allowed for the comprehensive characterization of wood components without compromising sensitivity. This was achieved by comparing the limits of detection (LODs) and limits of quantification (LOQs) of the different fungicides obtained from scan, SIM, and the combination of both scan and SIM (SITI). This method allowed for the fast, safe, and comprehensive study of the target analytes with high sensitivity and with minimal sample size and preparation.

91	Christina Burns	Counseling Psychology	Childhood maltreatment and mental health in early adulthood: Exploring the role of emotion regulation
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The purpose of this project is to propose a study that aims to build a better understanding of how experiences of childhood maltreatment impact well-being and emotion regulation in early adulthood. The current proposal would build on previous research by utilizing an emerging approach to measuring maltreatment (proposed by McLaughlin and Sheridan 2014), which examines domains of maltreatment (e.g., threat and deprivation), rather than specific form of maltreatment (i.e., physical abuse), or cumulative risk (i.e., a total score of a childhood maltreatment). This approach will allow us to explore the differential pathways through which domains of childhood maltreatment impact well-being and emotion regulation. We will be proposing a study that would utilize structural equation modeling to test the hypothesis that childhood experiences of threat and deprivation would moderately predict the latent variable of wellbeing, and that this relationship would be mediated by emotion regulation.

Poster	Presenter	Program	Abstract Title
92	Glavic Tikeri	Chemical Engineering	Effect of Temperature on Calcium Sulfate Scale Formation in Oilfield Industries.

In oilfield industries, calcium sulfate scale formation poses a significant challenge, impacting operational efficiency and costs. My research focuses on understanding the temperature-dependent dynamics of this issue using a unique continuous stirred tank reactor (CSTR) setup integrated with laser techniques. Calcium sulfate scale is notoriously difficult, affecting industries such as water treatment, oil production, and mineral processing. By examining temperatures ranging from 0 to 100°C, the influence of temperature on both the rate and magnitude of scale formation is scrutinized. The results obtained underscore a pronounced escalation in scale accumulation alongside a notable reduction in induction time as temperature increases, from about 3 hours at room temperature to just 34 minutes at 100°C. Scanning electron microscopy (SEM) analysis of scale crystals reveals temperature-induced changes in crystal morphology, indicating significant degradation. These insights are crucial for optimizing processes and developing effective scale mitigation strategies across various industrial applications.

93	Sae Young Lee	Geography	Water Quality Hotspot Analysis on Chlorophyll-A to Monitor Harmful Algal Blooms in Small and Medium Lakes of North Dakota
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The water quality of recreational lakes degrades with Harmful Algal Blooms (HABs). HABs can block sunlight, lower oxygen levels, and may produce toxins. Industrial and domestic waste fertilizer runoffs can enrich nutrients for HABs. Chlorophyll-a (Chl-a) is a significant indicator for tracking HABs and has been monitored increasingly using remote sensing techniques. In search for significant trends in hotspots of Chl-a concentrations in small and medium lakes of northeastern North Dakota, Chl-a water samples were collected in summer and fall of 2023. The study lakes include: Fordville Dam Recreation Area, Larimore Dam Recreation Area, Homme Dam Recreation Area, and South and North Golden Lakes. Six multi-band combination indices of Sentinel-2 and Landsat 8 remote sensing satellite imagery were compared with in-situ water sampling for Chl-a concentration. The seasonal trends and patterns are identified through Hotspot Analysis using the Getis-Ord G_i^* method.

94	Mosab Abu Al Foul	Education, Health, & Behavior Studies	The Arab Spring and Higher Education Protests: A Social Movement Theory Media Analysis
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This paper provides empirical evidence of the significant role of higher education in the uprisings in the Middle East and North Africa, also known as the "Arab Spring."

The purpose of this study is to address the root causes of education protests in the Middle East and how the civic injustice towards the educated class has triggered these protests, which is often a result of underlying issues, such as government corruption, lack of funding for education, and restrictions on freedom of expression. In doing so, this study addresses the following research questions:

1. How have the Arab Spring protests changed the nature, form, and politics of education protests in the Middle East?
2. What specific forms of civic injustice towards the educated class have triggered these protests

Theoretical & Conceptual Framework. The study employs the social movement.

Inquiry & Methods. We used the Global Database of Events, Language, and Tone (GDELT).

95	Frank Yeboah	Chemical Engineering	Exploring the Feasibility and Sustainability of Biomass and Waste-to-Energy Conversion Technologies for Tribal Nations: A Multi-Case Study Approach
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Due to climate change and a systemic lack of recourses, Tribal Nation communities face energy challenges due to less reliable and resilient energy systems. The goal of this research is to directly work with these communities to address their energy needs by creating energy roadmaps for each Tribal Nation. The use of renewable energy technologies align better with their cultural values, but there are many options to consider for feedstocks, technologies and energy products. This study will explore different conversion technologies and processes of biomass and waste to energy. The roadmaps will include the preliminary design of scalable energy solutions and economic assessments. A sustainability analysis that addresses greenhouse gas emissions, land and water usage will be also be conducted for each energy system. At least four roadmaps will be developed through this process based on the Tribal Nations preferences as determined through surveys.

Poster	Presenter	Program	Abstract Title
96	Thilini Bamunu Arachchige	Physics	Diffuse optical measurement of glacier ice properties

The production of meltwater from glacier ice heavily impacts glacier mass loss. Accurate modeling of glacier and ice sheet melt requires precise knowledge of how the optical properties of glacier ice respond to several factors, including dust, black carbon, algae, and warm air temperatures. The current challenge lies in the limitations of existing methods for measuring these optical properties. To overcome this, the study utilizes the propagation of nanosecond-duration laser pulses in near-surface glacier ice, extracting essential optical properties such as scattering and absorption coefficients. We employ a portable instrument featuring three lasers (405nm, 520nm, 640nm), a photon-counting detector, and a time tagger, enabling a time-resolved scattering experiment. The study entails the comprehensive characterization and modeling of the responses of lasers and detectors, enriching the understanding of the experimental setup crucial for subsequent fieldwork in Greenland. Glacier ice, Scattering coefficient, Absorption coefficient, photon-counting detector, pulse laser

97	Aaron Cooper	Counseling Psychology	Understanding the Grieving Process of Former Collegiate Athletes
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The NCAA boasts a vast pool of 520,000 collegiate athletes across Divisions I, II, and III, yet only about 104,000 transition to professional sports. This leaves a significant number of athletes grappling with the transition from college athletics to other pursuits, a process often fraught with poorly understood grief. This study aims to delve into the connection between student athletes' identity and post-college sports grief. Despite increasing research attention on athletes' transition experiences, there's a noticeable gap in understanding the grieving process. Employing online qualitative methods, this study utilizes the Adult Attitude to Grief Scale and the Athletic Identity Measurement Scale for data collection. Focused on former NCAA athletes from Divisions I, II, and III who exhausted eligibility or retired due to medical reasons, the findings could inform athlete support programs and mental health initiatives. Shedding light on this aspect of athletes' post-college lives offers valuable insights.

98	Daniel Iancu	Civil Engineering	Bridge 5872 Hydraulic Assessment: HEC-RAS 2D and ArcGIS Pro Bathymetry Modeling
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Bridge 5872 is a section of highway US 17 crossing the Red Rive of the North, that is affected by scouring. The proposed objective of this study is to investigate how the use of HEC-RAS, and ArcGIS Pro modeled bathymetry data affects the accuracy and reliability of bridge scour analysis. The hypothesis in this study is that a higher resolution bathymetry used in HEC-RAS 2D modeling will represent the water velocity under the bridge better than in a 2D model with a rougher bathymetry. Thus, the potential scour effect is closer to reality and the actual stability of the bridge is higher. The importance of this study reveals areas that need to be consolidated with rip-rap and possible new methods of using the HYCAT ASV scanner for bathymetry to improve bridge scour assessments.

99	Nimasha Samarawickrama	Physics	Performing nonlinear stability analysis for a highly interconnected gene network model
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Hematopoiesis, the process of forming all the types of blood cells, is a good model to study cell-fate choice. Inferring hematopoietic gene regulatory networks (GRNs) using gene circuit models is a crucial step in unraveling the complex dynamics governing hematopoiesis. A study has been carried out in which, a 12-gene model was used to model the dynamics of the gene regulatory network that governs differentiation into erythrocytes and neutrophils. We propose applying nonlinear stability analysis to this highly dimensional gene network model, to figure out qualitative behaviors in terms of stability. This will offer valuable insights into hematopoietic gene regulation and guide the development of targeted therapeutic interventions.

100	Kelsey Klinger	Counseling Psychology	Examining the Impact of Engineering Identity Among Latine Individuals
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The current study examined the impact that multiple variables have on Latine/Hispanic individuals working within the engineering field. The variables examined include engineering identity, negative outcome expectations, gender workplace microaggressions, and life satisfaction. The study will assess these participants using a structured qualtrics survey consisting of several questions related to the above variables. These variables will be assessed using likert scales. For this study, we propose the following hypothesis 1.) Engineering identity will be significantly predicted by negative outcome expectations, gender workplace microaggressions, and life satisfaction. A multiple linear regression was used to assess the hypothesis within this study. Results confirmed the hypothesis and showed that engineering identity was significantly predicted based on negative outcome expectations, gender workplace microaggressions, and life satisfaction, $F(3,502)= 8.23, p<.001$. Future research and clinical implications are discussed.

Poster	Presenter	Program	Abstract Title
101	Isra Elsamani	Chemical Engineering	The Efficiency of Corn Oil Derived Surfactant in The Corrosion Inhibition of C1018 Carbon Steel in Brine Solutions: Experimental Approach

Promoted by the growing interest in eco-friendly products to substitute fossil-derived materials, this research aims to convert agricultural biomass into renewable chemicals that have lower toxicity and production costs. It investigates the synthesis of bio-based surfactants from corn oil and their application in corrosion inhibition. Various reaction sequences and extraction systems were adopted to synthesize the bio-surfactant. Using Fourier transform-infrared (FT-IR) and nuclear magnetic resonance (NMR) tests, the bio-surfactant structure was confirmed. The surface activity of the bio-surfactant was tested using drop shape analysis. The corrosion inhibition properties of the synthesized bio-surfactant were investigated using weight-loss analysis and electrochemical impedance spectroscopy (EIS). The surface tension test shows an efficiency of 49.5% surface tension reduction at a concentration of 5%. Weight-loss and electrochemical measurements showed a decreasing corrosion rate with increasing concentration of the bio-surfactant.

102	Md Abdur Rahim Badsha	Chemistry	Synthesis of highly selective fluoroionophore for metal cations and their biological applications
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This work outlines the synthesis of MC 23. Which is metal ion selective ionophores. The synthesis proceeds in four steps: begin with DMN synthesis followed by hydrogenation to prepare DMA, then synthesis of OEG4DTs, and finally the formation of the macrocyclic ring structure from DMA and OEG4DTs which is confirmed by 1H NMR, 13C NMR, and Mass Spectroscopy. Combining MC 23 with a fluorophore makes fluoroionophore that will be used for clinical diagnostics.

103	Leisha Lunnie	Educational Foundations & Research	Advancing Women in Aviation Education
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In the United States, the workforce is made up of roughly 47% women with diversity, equality, and inclusion being widely promoted. In the aviation industry, women make up only 4.9% of the nation's professional pilots. There are different training options to becoming a professional pilot; such as Part 61 flight training, military training, and Part 141 training including collegiate aviation education programs. The number of females in any of these programs are still significantly less than their male counterparts with a very slow growth rate. The goal of this study is to explore the gender gap, stereotypes, and perceptions of women actively participating in aviation education. The researcher will provide a comprehensive analysis of existing research and literature of this topic as well as information gathered from qualitative surveys. The targeted subjects are those females enrolled in collegiate aviation training programs and females participating in Part 61 training programs.

104	Oluwaseyi Olorunfemi	Environmental Engineering	Exploring the Role of Laundry Fibers as Shuttles for Poly- and Perfluoroalkyl Substances
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Textile fibers constitute a significant portion of microplastic pollution in the environment. The majority of microplastics are released from synthetic textiles during laundry washing and are introduced into wastewater. Due to their hydrophobic/hydrophilic nature, microplastic fibers have an affinity for adsorbing contaminants and may act as shuttles for their transport in the environment. Poly- and perfluoroalkyl substances (PFASs) are manmade human carcinogens that have been used in the manufacturing process of many consumer products. The ubiquitous occurrence and interaction of these compounds with fibers in household and industrial wastewater are inevitable. Therefore, the main objective of this study is to examine the interactions between PFASs and microfibers in wastewater. To achieve this, adsorption experiments will be conducted with selected PFAS compounds and various types of textile fibers (cotton, polyamide, polyester) in distilled deionized water (DDW) and wastewater to evaluate the role of laundry fibers in the environmental fate of PFAS.

105	Justin Phillippi	Counseling Psychology	Design and Implementation of a Peer Supported Mentorship Program for Enhancing Mental Wellness among Probationary Firefighters
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This project introduces a peer-supported mentorship program developed in collaboration with a local fire department to enhance mental wellness among probationary firefighters. The program will recruit 20-25 probationary firefighters in their first year, alongside approximately 15 peer mentors. It integrates semi-structured one-on-one mentorship sessions led by members the fire department's peer support team, incorporating discussion, workbook-based reflection and journaling. Focused on addressing firefighter-identified mental health challenges and literature-noted risks, the program aims to reduce mental health stigma, enhance coping skills, foster positive relationships, boost resilience, and maintain life satisfaction amidst increased work stress. Interventions include fostering peer support relationships, providing psychoeducation, engaging in reflection exercises, and offering tools for interpersonal relationship enhancement. Outcomes will be evaluated using quantitative measures administered to probationary firefighters at the cycle's start and end, supplemented by open-ended responses from both probationary firefighters and their peer mentors.

Poster	Presenter	Program	Abstract Title
106	Ethan Weisberger	Atmospheric Sciences	Cold pool impacts on supercell development and updraft characteristics

Supercell thunderstorms are a special type of weather phenomenon characterized by an intense rotating updraft, and disproportionately account for most severe weather reports compared to ordinary thunderstorms. This study aims to fill in gaps to fundamental questions surrounding how the cold air from precipitation (i.e., the cold pool) impacts the development, maintenance, and strength of supercell thunderstorms, while quantifying the importance of cold pools in redirecting inflow air into the updraft. An idealized numerical cloud model was used in which half of the simulations had a cold pool, while the other half had it “turned off” by neglecting evaporation of rain and melting of hail processes. Our results show that the cold pool is indeed important in redirecting air into the updraft, thus creating stronger low-level updraft rotation and strength, while promoting increased storm translational velocity and mid-level updraft size.

107	Krista Steele	Teaching & Leadership	Higher Education Faculty and Student Accommodations: A Review of the Literature
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Students with disabilities are attending higher educational institutions at a higher rate each year. According to the National Center for Education Statistics (NCES), in the 2019-2020 academic year (NCES most recent data) 21% of all undergraduate students and 11% of all graduate students had a disability. Many of these students are in need of supports, called accommodations, in the classroom and on campus. However, this can be a struggle for the student and the faculty working with them. The aim of this research is to conduct a literature review on what is known about faculty's perceptions and knowledge of providing accommodations to students who have disabilities.

108	Tihitna G. Mulugeta	Environmental Engineering	Predicting Full-Scale Performance of Carbonaceous Adsorbents for PFAS Adsorption: The role of Rapid Small-Scale Column Tests (RSSCTs)
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Per- and poly-fluoroalkyl substances (PFASs) have been used in many consumer products due to their high stability, unique surfactant features, oil and water repellency, and chemical resistance. These chemicals are persistent, non-biodegradable, and bio-accumulable in the aquatic environment, which may lead to cancer, liver damage, and endocrine disruption. Granular activated carbon (GAC) adsorption has been proven to be effective for PFAS removal. However, the performance evaluation of GAC in full scale operations is time-consuming and expensive. Therefore, there has been an interest in using rapid small-scale column tests (RSSCTs) to predict full scale performance of GAC for PFAS removal. The main aim of this review is to (i) evaluate the role of RSSCTs configurations and predictive model parameters on PFAS adsorption, (ii) examine molecular-level interactions between PFAS and GAC in different water matrices, and (iii) highlight the current literature gaps and future research directions.

109	Claiborne Wooton	Atmospheric Sciences	Investigating the Impact of Urban Areas on Quasi-Linear Convective Systems
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Metropolitan areas absorb and radiate heat at a higher rate compared to surrounding rural areas due to a number of factors, including a city's tendency to have sparse vegetation and tree canopies along with high incidences of pavement. This research involves analyzing how the structure of quasi-linear convective systems (QLCSs) – a.k.a squall lines (strong, narrow storms that are several hundred miles long) – are altered as they pass over urban areas. Due to every city's unique distribution of various land cover types and population, their potential effectiveness at modifying QLCSs will vary. Because of this, cities of varying size and population density will be analyzed to understand their effect on QLCS structure. Initial results reveal higher frequencies of intense rainfall associated with QLCSs over the downwind side of the urban areas studied.

110	Frannie Tunseth	Teaching & Leadership	Insights from the Heartland: Examining Teacher Perceptions of Trauma-Informed Education in Rural Schools
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Trauma significantly impacts students in today's educational landscape, affecting their development and learning. Trauma-informed practices have emerged as a vital framework to address this issue. This study focuses on trauma-informed education in rural schools, particularly in Traill County, North Dakota, known for its geographic isolation and limited mental health resources. Using a qualitative approach grounded in ecological theory, the research seeks to explore teacher perceptions of trauma-informed practices and factors influencing their adoption. By examining educators' experiences and rural contextual nuances, this study seeks to offer valuable insights into fostering supportive learning environments. The findings inform policymakers, administrators, and educators in devising strategies to implement trauma-informed practices effectively, ensuring schools provide healing environments for all students.

Poster	Presenter	Program	Abstract Title
111	Jenice Lynch	Computer Science	Computational Thinking using Algorithmic Thinking

The increase in technological advancements has led to widespread digital device adoption in various spheres of everyday life including education. Educators face a significant challenge in equipping students with the skills to utilize digital technologies for innovative thinking and problem-solving which are key educational objectives for K-12 students. A crucial factor to achieving this objective lies in integrating Computational Thinking into the educational curriculum. However, a central question arises: What is an effective approach to teaching Computational Thinking to the K-12 students? This paper proposes using the systematic process of presenting problem solutions known as Algorithmic Thinking as a pedagogical tool for teaching Computational Thinking. A core feature of Algorithmic Thinking lies in the practice of writing algorithms which is the way problem solutions are presented in Computer Science. By engaging in algorithmic writing, students should develop the foundational skills associated with Computational Thinking.

112	Lynnlee Rosolino	Atmospheric Sciences	Analyzing the Effects of Cloud Seeding on Hail Suppression during the North Dakota Cloud Modification Project
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The North Dakota Cloud Modification Project (NDCMP) is a summertime weather modification project in western North Dakota which aims to suppress hail and increase rainfall by introducing artificial ice nuclei into storm updrafts. This creates more small hailstones rather than the fewer large hailstones which would occur naturally. This study will use a radar-based hail size retrieval algorithm (HRA) to determine observed hail size, rather than ground-based observations as previous economic studies have used. The combination of severe weather indices and HAILCAST output from the University of North Dakota Weather Researching and Forecast (UND-WRF) model allows for a skillful forecast of either no hail, less than 2-inch diameter hail, and greater than 2-inch diameter hail. The HRA output will be compared with the model forecast. For unseeded cases the forecasted and observed hail sizes should match, however, for seeded cases the forecast should be larger than the observed hail size.

113	Kathryn Ellingson	Counseling Psychology	Stress Management Among Student-Athletes: Understanding the Utilization of Stress Management Techniques
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Stress is used to describe anything that is seriously threatening to the internal balance. A stressor is known as the threat that is either perceived or an actual threat to the individual. The reaction the body creates to the stressor is also known as the stress response (Statler and DuBois, 2016). Unlike the general population, athletes experience stressors due to increased time requirements, injuries, the lack of a most valuable player status, the chance of being put on the bench, the possibility of interpersonal conflicts with coaches and/or teammates, as well as an increase in academic difficulty at the college level (Pritchard & Wilson, 2005). These stressors have an impact on the mental and physical health of student athletes. The purpose of this study is to examine how student athletes manage their stress levels through analyzing what stress management strategies are effective and which ones are utilized by student-athletes.

114	Marco Hernandez	Chemical Engineering	Technoeconomic Analysis on Biogas Utilization in Refuse Power Plants
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As the energy industry shifts towards a heavier priority on decreasing the environmental impact caused by power plants, an innovation that repurposes existing coal processing facilities has been in high demand. A Techno-Economic Analysis (TEA) that focuses on transporting and co-firing biogas, a renewable fuel obtainable from landfills or through anaerobic digestion, with waste coal, which is a source of pollution in need of remediation, has been conducted to evaluate the benefits of net-negative carbon emissions. ASPEN Plus V14 simulations were constructed and utilized to aid the process estimation for the proposed retrofit. The Levelized Cost of Electricity (LCOE) and Total As-Spent Costs (TASC) were derived for four cases, which varied biogas flow rates as fuel, and were then used as the basis for justifying feasibility. Increased amounts of co-fired biogas resulted in a lower Greenhouse Gas Abatement Incentive to be necessary to become feasible against a non-retrofit process.

115	Ene Ajonye	Earth System Science & Policy	Impact of land use dynamics on estimated pollinator abundance and its implications for ecosystem services associated with canola production in Cavalier, North Dakota
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Canola, a globally significant crop used for its oil-rich seeds in various industries, holds economic importance in Cavalier, North Dakota's agricultural landscape. With canola cultivation experiencing steady growth, understanding factors influencing its yield and sustainability is crucial. Pollinators, including bees, play a vital role in canola reproduction. The research focuses on assessing bee habitat and estimating pollinator abundance using InVEST software. It aims to explore the relationship between pollinator presence, habitat conservation, ecosystem services, and canola yield. Preliminary results show a high concentration of pollinator abundance in the northeastern region of the county. This study's relevance lies in addressing global concerns about pollinator declines and promoting sustainable agricultural practices. The research seeks to develop strategies that enhance crop yields while preserving essential ecosystem services.

Poster	Presenter	Program	Abstract Title
116	Sara Tezel	Teaching & Leadership	AI in the Classroom Could be a Problem. Professors Are the Solution.

One of the hottest topics in education today is Artificial Intelligence (AI) and the role it is starting to play in education, both as a tool and as a crutch. Exploring the responsibility that professors hold in recognizing, utilizing, and teaching usage surrounding this feature is paramount to conquering the fear that accompanies the many unknowns of technology's current golden child.

117	Musabbir Jahan Talukder	Chemical Engineering	Towards Sustainable Water Purification: Insights from Pilot Studies at GFRWTP
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Ensuring a sustainable, clean water supply is vital for societal development. Reverse Osmosis (RO) membrane technology plays a key role in sustainable water purification. RO filtration employs specialized membrane filters to separate impurities at high pressure. Consequently, membrane fouling occurs when these impurities irreversibly deposit on the membrane surface, reducing purification efficiency and shortening membrane lifespan. To address this issue, pretreatment and anti-fouling agents are often employed, but they come with their own challenges, including inadequate targeting of critical fouling agents and resulting in additional operational costs. To study the fouling effects, we conducted a study at the Grand Forks Regional Water Treatment Plant (GFRWTP), running four pilot RO skids with three anti-fouling agents over the summer and winter seasons. Our findings reveal varied fouling behaviors induced by anti-fouling agents, with synergistic phosphate-assisted biofouling. This study provides insights into fouling patterns and offers operational recommendations for RO filtration processes.

118	Herbert Mughe	Chemistry	Nanozymes as Detectors of Metal Ions and Powerful Tool in Environmental Management
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Nanozymes are a class of artificial enzymes that have dimensions in the nanometer range and can be composed of simple metal and metal oxide nanoparticles, metal nanoclusters, dots (both quantum and carbon), nanotubes, nanowires, or multiple metal-organic frameworks (MOFs). In recent years, the field of nanozymes has experienced rapid advancement and they offer distinct advantages over natural enzymes, including ease of production, cost-effectiveness, prolonged storage capabilities, and exceptional environmental stability. Nanozymes are catalytically active, stable, recyclable, and versatile. Therefore, increasing attention has been paid in the fields of nanotechnology, environmental science, and life sciences. In this review, we will provide a concise overview of applications of nanozymes in the detection of metal ions and removal of pollutants such as pathogens, toxic ions, pesticides, phenols, organic contaminants, air pollution, and antibiotic residues. Furthermore, we will discuss on the current challenges and future trends of nanozymes towards nanotechnology and environmental monitoring.

119	Nesreen Jaber	Counseling Psychology	Arab American Masculinity and Mental Health
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This study focuses on the experiences of Arab American men regarding their perspectives and lived experiences with mental health concerns and professional services in the United States. The aim of this study is three-fold: a) to explore what mental health means to Arab American men along with their attitudes and understanding of mental health counseling; b) to illuminate perceived barriers towards accessing professional mental health services; and c) to explore resources Arab American men are currently utilizing for psychological benefit and life guidance. A central guiding principle in this endeavor is to center the voices of this community in addressing any barriers so that mental health services may become both appealing and accessible. I will present the literature review and proposed methods, as I am still awaiting IRB approval and have not yet been able to conduct interviews to gather the data.

120	Mohammad Ali	Electrical Engineering	Private Distributed Computing: A Federated Learning Approach With Flower
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In distributed computing, the preservation of privacy stands as a paramount concern. Researchers have directed their efforts towards developing systems that circumvent direct access to private data. This research aims to address privacy concerns in AI/ML, particularly Federated Learning (FL). The aim is to establish an infrastructure utilizing Flower, an open-source framework adept at deploying scalable, privacy-centric FL in a simulated wireless environment. The methodology involves simulating multiple local model computing clients, transmitting model updates back to a central server. This server aggregates local model changes, computing a singular model without direct exposure to private data. Our endeavor is to provide an initial step towards safeguarding privacy in environments that integrate ML algorithms fortifying information security. This work is a start in distributed computing with a focus on privacy, demonstrating a scalable approach to private FL and its potential implications for both the industrial and academic sectors.

Poster	Presenter	Program	Abstract Title
121	Minnie Kalyanasundaram	Teaching & Leadership	Evaluation of a pilot pre-matriculation program for entry-level medical students at an upper mid-west medical school

Background: Medical schools utilize pre-matriculation courses as academic support programs with varied content tailored to facilitate smooth transition for entry level medical students. Evaluation of program is important to understand their efficacy for future programmatic changes. Methods: This study aimed to evaluate a pilot online, 6-week, asynchronously delivered summer pre-matriculation program in 2022 and 2023 at the School of Medicine & Health Sciences, University of North Dakota for entry level medical students accepted into the medical program. An evaluation survey questionnaire on the effectiveness of the pre-matriculation program was administered to all medical students. Fifteen medical students who had fully participated in all components of the pre-matriculation program completed the questionnaire. Results: 30.8% of students responded to studying 1-3 hours per week, 38.5% -4-6 hours and 30.8% - 6 or >hours per week. Likert's scale showed 57.1% were satisfied with their efforts, 7.1% were dissatisfied and 35.1% chose to remain neutral. ... (abstract truncated)

122	Bashini Kankanamge	Physics	Impact of doping on oxidation of MoAlB
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MoAlB has garnered great attention for its unique combination of mechanical and thermal properties. MoAlB has remarkable oxidation resistance, attributed to formation of a protective Al₂O₃ scale. First-principal calculations based on Density Functional Theory (DFT) are performed to explore the impact of doping on the oxidation behavior of MoAlB. We introduce dopants Si, Zr and C into the (010) surface of MoAlB to investigate how the interaction of O₂ with surface changes. Our study aims to identify the appropriate dopants atoms for enhancing oxidation resistance of MoAlB. Particularly, our work focuses on the effect of doping on the binding of oxygen atom on the surface and the charge distribution of each structure of MoAlB doped with Si, Zr and C respectively.

123	Anne Marques Catarin	Music	Cyclical musicians: College music students' experiences on instrumental musicking processes across the menstrual cycle
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Despite the extensive literature on musician health, the lack of menstrual studies in instrumental music research reveals a present epistemological gap. Within the framework of Critical Menstruation Studies (Bobel et al., 2020), I investigated how instrumental music majors perceived their menstrual cycles manifesting in their musicking. Using menstruation as a research lens resulted in two major outcomes, including addressing the literature gap on menstruation in musicians and discussing social and cultural issues within music academic settings. After conducting individual and focus group interviews, I found themes such as the perceived changes in musicking according to cycle phase, perceptions of menstrual concealment as a social imperative, difficulties in self-care due to music major overload, and internal struggles about discussing menstrual topics in academic settings. These results invite further research and discussion on possible interactions between menstrual health and instrumental music-making, revealing structural gender inequality and student overload within music departments.

124	Mohamed Ali	Environmental Engineering	Electro Assisted Regeneration of Organic Contaminant-laden Activated Carbon
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Organic contaminant (OC) removal by adsorption has been one of the main technologies used in conventional treatment operations. Unfortunately, the disposal or ex-situ regeneration of saturated adsorbents is not environmentally friendly and cost effective. Electrochemically driven regeneration technology has been receiving increasing interest for the in-situ regeneration of OC-laden adsorbents due to its low energy consumption and environmentally friendly nature. The objectives of this study were to (i) investigate the impact of adsorbent type and operating condition on the efficiency of electro-regeneration and (ii) the effects of sequential adsorption and electro-regeneration cycles on the regeneration efficiency. In this study, ciprofloxacin, a commonly used antibiotic, was selected as a model organic compound. Two carbon-based adsorbents, pristine F400 and iron doped F400 activated carbons were tested for their adsorption/regeneration efficiencies. The results showed that electro-regeneration was effective for the complete regeneration of the adsorbents.

125	Mouhmad Elayyan	Chemistry	A Theoretical Investigation of Metal Ion Capturing and Selectivity Used In Biosensing
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Quantum mechanical, or QM, calculations are described as ab initio methods for determining chemical properties of a system, divided into broadly two main approaches. Wavefunction, an approach that utilizes a wavefunction and Hamiltonian parameterized for all possible electron locations; thus, they provide very accurate models at high costs. Density Functional Theory, an approach that does not utilize a wavefunction, and its Hamiltonian is a parameter of only three variables, resulting in near-accurate models at significantly lower costs. Choosing the most appropriate method and basis set for a system remains a challenge; furthermore, key chemical phenomena, present in biological systems, tend to be difficult to model, such as binding energy calculations. The purpose of this research is to provide accurate chemical models of cage molecules, named Macrocyclic compounds, used in biosensing of Group 1 metal ions, while evaluating different QM method's capabilities and performances in describing metal ion capturing and selectivity.

Poster	Presenter	Program	Abstract Title
126	Kevin Read	Educational Foundations & Research	“Higher social and intellectual aspirations”: The teacherage’s place in rural progressive education

At the turn of the 20th century, a nationwide fixation on a rural education took hold amidst concerns with a population exodus to major cities. Rural school districts implemented numerous policies to address concerns that their students were receiving an inferior education to their urban counterparts. Teacherages, or housing provided for educators on school property, were implemented as a recruitment and retention policy for bringing in city teachers. In addition to functioning as residences for educators that had received formal training, teacherages served as community spaces for curriculum reform. Students and their families engaged in emerging Progressive Era ideas including the new subjects of vocational and civics education. Document analysis of primary sources such as reports, pamphlets, and newspaper articles depict teacherages as sites of progressive education come to life at a time when rural spaces sought to balance calls for progress with a desire to retain their rural identity.

127	Olufemi Oni	Chemical Engineering	Development of Efficient and Stable Biopolymer Supplement for Geothermal Renewable Energy Generation
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Polymer flooding is a well-established tertiary technique to improve sweep efficiency of water in energy reservoirs. Currently, the use of Hydrolyzed Polyacrylamide, HPAM is the industry workhorse in polymer EOR in reservoirs with low salinity and temperature. Some industries have also employed the use of cement to block rock fractures. But these materials tend to lose their functionality at high temperatures and salinities. This study utilizes cost-effective, environmentally friendly hydroxyethyl cellulose, HEC material and suitable organic crosslinkers like Hexamethylenetetramine, HMTA and Resorcinol crosslinkers. The Gelation Time, G.T was studied from 115oC and 150oC to study the variation and performance of the polymer at high temperature and salinity using a Central Composite Design, CCD and optimized using Response Surface Methodology RSM. The conducted stability study shows that the eco-friendly and low toxic gel system can be used in high temperature reservoirs to increase the sweep-efficiency of fluid in Geothermal energy generation.

128	Jappreet Singh Gill	Biomedical Engineering	Characterization of a Patient-Derived Xenograft Mouse Model for Investigating Drug Targets in Colon Cancer
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Patient-derived xenograft (PDX) mouse models have emerged as valuable tools for preclinical evaluation of therapeutic targets in cancer research. Here, we present the establishment and characterization of a novel PDX mouse model for colon cancer, aimed at investigating potential drug targets. Tumor tissues from colon cancer patients were engrafted into immunodeficient mice, resulting in the successful generation of PDX models that retained the histopathological and molecular characteristics of the original tumors. Through comprehensive genomic and transcriptomic analyses, we identified key genetic alterations and signaling pathways associated with colon cancer progression in our PDX models. Furthermore, we evaluated the efficacy of candidate drug targets using both in vitro assays and in vivo experiments in PDX mice, providing valuable insights into potential therapeutic strategies. Overall, our study highlights the utility of PDX mouse models in elucidating colon cancer biology and identifying promising drug targets for further clinical investigation.

129	Madison Adrian	Psychology	Do I Qualify? Death Qualification Characteristics
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Prior to being placed on a capital jury, participants are screened regarding beliefs about the death penalty. The death qualification process has faced several updates over the years in attempt to provide the courts with a balanced jury, yet some skepticism remains regarding the characteristics and beliefs of a death-qualified juror. The present study aimed to evaluate differences in mock jurors' cognitive processes, sentencing decisions, and attitudes based on death-qualification status. In addition to death-qualified jurors, the two types of excludable jurors, automatic life-sentencing and automatic death-sentencing, are also examined. These findings will be discussed in detail and will contribute to our current understanding of death qualification standards, as well as knowledge of characteristics and attitudes associated with a death-qualified juror. Both policy and research implications will be addressed.

130	Meisam Shayeghmoradi	Electrical Engineering	VideoMAE: Empowering End Customers through Data-Efficient Video Compression
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VideoMAE introduces an innovative approach to video compression that enhances transmission efficiency while empowering end customers. By leveraging masked autoencoders (MAEs) during self-supervised video pre-training, VideoMAE operates exclusively in the compressed video domain. The extremely high masking ratio and tube masking strategy encourage robust feature extraction. Beyond compression, VideoMAE shifts the power dynamic by allowing users to influence video quality and transmission. End customers become active participants, adjusting compression levels and resolution. Our experiments demonstrate that VideoMAE outperforms existing methods, fostering a more inclusive and personalized video experience.

Poster	Presenter	Program	Abstract Title
131	Jude Ambe Musongong	Chemistry	Light Induced Coumarin Based Crosslinked Polyesters via Zinc Catalyzed ROCOP of Epoxides and Cyclic Anhydrides

The increasing demand for crosslinked polymeric materials in advanced application requires the development of new sustainable methods and materials to reduce cost and adverse effect of processes on the environment. This research reports a new eco-friendly light assisted synthesis of highly crosslinked polyester by combining light induced (2+2) cycloaddition with zinc catalyzed ring opening copolymerization of cyclic anhydrides and epoxides. By incorporating naturally occurring coumarin as photoactive moieties, we were able to synthesize polyesters that are crosslinkable with UV-A light at room temperature. The effect of reaction parameters such as monomer concentration, catalyst activity, reaction time and yield are investigated using several techniques including NMR spectroscopy (¹HNMR & ¹³CNMR), GPC and UV-Vis. Polyester formed with varying coumarin subunits show high molecular weight (Mn) and crosslinked polymer formed are expected to show promising characteristics for potential applications in various fields.

132	Dedan Kusaga	Education, Health, & Behavior Studies	Factors that Contribute to International Black Students' Sense of Belonging in Predominantly White Institutions
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This quantitative study aims to identify the key factors influencing the sense of belonging among International Black students in predominantly white institutions (PWIs). The study focuses on evaluating the effectiveness of University Administrative Support, Student-Faculty Interaction, and Student-to-Student Interaction in enhancing the sense of belonging for International Black Students in PWIs. Data will be collected through online surveys, which will be distributed randomly via email to 150 participants, specifically international Black students at the University of North Dakota (UND). The goal is to gather responses from at least 100 participants. Utilizing SPSS, the collected data will be analyzed using various statistical methods, including descriptive statistics, ANOVA, and multiple linear regression. The results of this research aim to provide valuable insights for university administrators to formulate strategies for fostering a stronger sense of belonging among International Black students in PWIs.

133	Wen Sun	Chemistry	Facile Synthesis of 3D rGO/NixCoyOz as a Binder-free Electrode for High Capacitance Supercapacitor
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To enhance the electrochemical properties for supercapacitor applications, a three-dimensionally (3D) structured material was developed using a facial hydrothermal method to synthesize a nickel cobalt oxide (NixCoyOz) nanocomposite between the layers of reduced graphene oxide (rGO). The microstructure, composition, and electrochemical properties of this 3D rGO/NixCoyOz electrode material were systematically characterized using scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), cyclic voltammetry (CV) of different scan rates, galvanostatic charge-discharge (GCD), and electrochemical impedance spectroscopy (EIS). Notably, this material exhibited a good specific capacitance (Cs) of 2612 F/g and high mechanical integrity, making it practical as an advanced electrode material for scalable energy storage devices.

134	Diane Tangmi	Chemistry	Green Synthesis of (S)-5-Hydroxymethyl-2(5H)-furanone from a Furfural Feedstock.
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(S)-5-Hydroxymethyl-2(5H)-furanone (HBO) is a versatile chemical intermediate used for the synthesis of several bioactive compounds such as trans-burseran, isostegane or muricatacin. Its conversion into sustainable chemicals is of strategic importance to the continuity and growth of the economy. The transition into a bioeconomy necessitates less dependence on fossil fuels for the production of chemicals, energy and materials. HBO has been readily prepared through a mild oxidation of 5-hydroxymethylfurfural using sodium perborate (NaH₂BO₄) in an acetic acid medium. Sodium perborate has shown to be an efficient and green reagent for the synthesis of HBO in one step. In this preparation, sodium perborate serves as an active source of oxygen with similar oxidizing properties as hydrogen peroxide. The reaction was optimized by varying temperature and time. Under optimum conditions of 50 °C for 4 hours, HBO yield was 94%. The percentage yield dropped drastically as temperature increased to 100 °C.

Poster	Presenter	Program	Abstract Title
135	Muhammad Salahuddin	Educational Foundations & Research	Faculty Technological and Research Proficiencies as Predictors of Research Success

Faculty research success positively impacts academic and private industry. This study measures faculty research success using the technology adaptation model (TAM; Davis, 1987) through the lens of faculty research proficiency and technological proficiency for research. Following a quantitative research design, survey data were collected from 347 faculty using Likert scales. Participants were predominantly white women and mostly were tenured assistant professors. The results indicate that faculty had moderate research proficiency and technological proficiency for research. Faculty research and technological proficiency varied significantly based on their demographic characteristics (gender, race, rank). Faculty research proficiency has a linear relation with faculty technological proficiency for research. Structural equation modeling revealed that faculty research success was predicted strongly and positively by faculty technological proficiency for research over faculty research proficiency. Following the study findings, universities can offer some need-based training for faculty to improve faculty proficiency in research and technology which may increase their research productivity.

136	Houdaifa Khalifa	Energy Engineering	Machine Learning-Based Real-Time Prediction of Formation Lithology and Tops Using Drilling Parameters with a Web App Integration
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Accurately predicting underground formation lithology classes and tops represents a critical challenge in the oil industry. Our machine-learning (ML) model, offers a novel solution for real-time litho-facies identification from drilling data. With a mean accuracy of 95% and a precision of 98%, the model excels in identifying claystone, marl, and sandstone classes. It overcomes limitations of traditional methods, such as time lags and data scarcity, by utilizing nine drilling parameters, thus expanding beyond the common rate of penetration (ROP) focus. The model was rigorously trained and evaluated using the open Volve field dataset, incorporating extensive data preprocessing to minimize features, balance sample distributions, and eliminate bias. This approach demonstrates exceptional performance, significantly advancing real-time geosteering. The enhanced accessibility of our models through the user-friendly web app "GeoVision" facilitates their effective application by drilling engineers, marking a significant advancement in the field.

137	Jennifer Bradford	Space Studies	Investigation of Potential Habitable Confirmed Exoplanets
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Exoplanets are planets that orbit stars and are located outside of our Solar System. There is a current count of 5,539 confirmed exoplanets and 6,977 TESS Project Candidates. But of these confirmed exoplanets, how many of these exoplanets may have the conditions to host life as we know it? Probable options include terrestrial exoplanets like Mars-sized, Earth-sized, Super-Earths, or Hyceans worlds. Data is analyzed from NASA's Exoplanet Archive using set parameters including mass, radius, host star type, semi-major axis, star's habitable zone, temperature, and rotation. If data exists, the planetary atmosphere will also be analyzed. This proposed individual research project aligns with NASA's exoplanet exploration and goal of searching for life in the universe. It will help to keep a list of target exoplanets for scientists to analyze using the James Webb Telescope potentially further for atmospheric indicators indicative of life.

138	Samantha Proctor	Occupational Therapy	Transitional Support Programming for First-Year Occupational Therapy Graduate Students
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Transitioning from undergraduate to graduate-level programming can be challenging (Box & Moffat, 2019). First-year graduate-level students experience work-life imbalance, especially within the first semester of their academic career (Malek-Ismael & Krajnik, 2016). Healthcare students are particularly vulnerable to burnout when pursuing their degree (Murthy, 2022). Additionally, first-year graduate students commonly lack the necessary academic and professional skills to be successful in their healthcare program (Dirks-Naylor et al., 2019). Prioritizing academic and professional skill development within higher education settings may make the transition into graduate-level programming more successful (Hutson et al., 2021). Higher education literature has indicated that transitional support programs offer a multitude of benefits that mitigate the difficulties students typically experience when transitioning into graduate school (Skildum et al., 2016). Many universities and academic institutions offer transitional student success programs for graduate students to increase academic success, reduce dismissal rates, and reduce academic hardships (Kosobuski et al., 2017).

Poster	Presenter	Program	Abstract Title
139	Oluchukwu Sunday	Energy Engineering	Optimisation of rankine system in coal fired power plant

Coal has been a reliable and inexpensive energy source throughout human history, dating back to the industrial revolution. Coal is a solid fossil fuel composed of carbon and hydrocarbons, which can be burned for fuel and used to generate electricity. The Rankine cycle, developed in 1859 by Scottish engineer William J.M. Rankine, is the cycle of heat release and use. Coal is used to produce heat within a boiler, converting water into steam which then expands through a turbine producing mechanical rotation within a generator. In the U.S., 200,568 megawatts (MW) of coal-fired capacity are currently in use (EPA, 2022). The goal of this study is to research optimization technologies for the Rankine cycle, which will significantly increase the efficiency of a coal-fire power plant. It is established that the Rankine cycle is a closed-loop system, with main purpose to convert thermal energy into mechanical work which can drive a generator and generate electricity. ... (abstract truncated)

140	Mason Clobes	Chemistry	Developing a Method for Identification and Quantification of Lignin Thermal Breakdown Products
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Lignin is an aromatic polymer found in plant biomass making it a promising feedstock for renewable chemicals or biofuels. The use of lignin has been limited by its structural complexity which hinders conversion of the raw material to useful, targeted products. Current methods are being designed to fragment lignin into various useful chemicals. The success of each method is usually monitored by gas chromatography-mass spectrometry (GC-MS), but GC-MS is limited to volatile compounds. Recently developed thermal desorption pyrolysis GC-MS (TD-Py-GC-MS) provides identification of breakdown products resulting from individual temperature steps. TD-Py-GC-MS requires several standards and fairly intensive data processing for quantification. In this study, we build upon TD-Py-GC-MS identification capabilities with the addition of a methanizer flame ionization detector (mFID). The mFID allows for simultaneous carbon quantification along with identification in the combined TD-Py-GC-MS-mFID method. Herein, we investigate the quantitative response of the mFID for standard lignin breakdown products.

141	Robbie Lunnie	Educational Foundations & Research	Scenario-Based Simulations in Urban Air Mobility (Uam) Flight Training: A Mixed Methods Study
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Urban Air Mobility (UAM) is a transportation initiative to develop a system for transporting people and cargo between local, regional, and intraregional areas using new and emerging aircraft technologies. Because this ground-breaking form of transportation is expected to be fielded in 2028, there is a crucial need for trained and qualified pilots. This mixed methods, grounded theory study focuses on experiential learning in aerospace education, specifically scenario-based simulations in post-secondary learning institutions in UAM powered lift flight training. Although hands-on flight training in controlled environments for fixed-wing operations has been used since the early 1900s, the use of scenario-based simulations for UAM flight training is new. Exploring seminal research designs and methodologies in education and adapting them for modern UAM research is a cornerstone of this investigation. Because of this, principles and theories highlighted by the nineteenth and twentieth-century psychologist and educational philosopher John Dewey will be used extensively.

142	Hasin Rehana	Computer Science	Extracting Protein-Protein Interactions from Biomedical Literature using Large Language Models
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Protein-protein interactions (PPIs) are crucial for understanding genetic mechanisms, disease pathogenesis, and drug development. Automated PPI extraction is essential for efficient scientific discovery. Large language models can be pivotal in this task due to their advanced capabilities in understanding and processing natural language. This study evaluates the capabilities of Generative Pretained Transformers (GPT) and Bidirectional Encoder Representations from Transformers (BERT) based models for PPI identification using three gold-standard corpora: Learning Language in Logic (LLL), Human Protein Reference Database (HPRD50), and Interaction Extraction Performance Assessment (IEPA). BioBERT emerged as the leader, recording the highest recall at 91.95% and an F1-score of 86.84% on the LLL dataset. GPT-4, despite not being trained explicitly for biomedical texts, achieved commendable performance with the highest precision of 88.37%. For the HPRD50 and IEPA datasets, BERT-based models did better than others. However, GPT-4 performance stayed close, showing that it can extract PPIs from text data accurately.

Poster	Presenter	Program	Abstract Title
143	Bernard Ussher	Chemistry	Genus Typha: Extraction, Isolation, Characterization, Phytochemistry and Bioactivity

The therapeutic nature of Cattail - Genus Typha has been previously established. Several studies carried out over the years has provided scientific evidence that Cattail species possess therapeutic activities such as antibacterial, antioxidant, anti-inflammatory and cytotoxic activities. This review seeks to synthesize and highlight the current state of art of understanding of Cattail biological activity in relation to identified bioactive compounds and cattail phytochemistry. This review will also consider approaches to extraction and isolation of the bioactive constituents and their possible impact on chemical speciation and biological activity. Furthermore, we will consider the various methods which have been used to characterize these bioactive constituents. In summary, this will serve as a comprehensive overview of all work that has been done in relation to the therapeutic abilities of cattail species so as to add to knowledge and identify any research gaps.

144	Ellyssa Peterson	Education, Health, & Behavior Studies	The Gut-Brain Connection: Elevating Mental Health and Performance in Sports and Physical Activity through Imagery
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Exploring the connections between imagery in sports and physical activity and the well-being of both the body and mind in relation to gut health is a new research area gaining in popularity. Gut distress is very common amongst endurance athletes with many reporting symptoms during actual performance (e.g., bloating, cramps, side aches, urges to defecate, defecation, and diarrhea nausea, vomiting, belching, heartburn, and chest pain). Imagery techniques are powerful tools that athletes can tap into to optimize their gut-brain performance. Incorporating imagery techniques into training and performance routines is an accessible and low-cost psychological skills training technique. Teaching mental imagery techniques for gut health also empowers individuals to take an active role in managing their own health and broadens their awareness and understanding of the mind-body connection. Imagery practices can also be adapted to be culturally relevant and inclusive, respecting diverse perspectives and belief systems.

145	Rahate Ahmed	Energy Engineering	3D heterogeneous modeling of lithium battery electrode for fast charge application
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A key component that has paved the way for the commercial success of lithium ion battery is the graphite, which has served as a lithium-ion host structure for the negative electrode. During the lithiation process, lithium ions travel through the electrolyte and take position in the layered structure of graphite. A graphite particle with a smaller diameter exhibits faster lithiation process compared to a bigger one. On the other hand, graphite particles near the separator intercalates faster than the particles near to the current collector. In this research, we performed a numerical modeling to understand the behavior of graphite particles during the lithiation process. Modeling results reveal that how a cell's capacity varies for different arrangement of graphite particles for the high charge discharge rate. According to the modeling results, a gradient structure of graphite electrode can be designed for the fast charging applications.

146	Ossai Alu	Earth System Science & Policy	Mapping Floral Resources using Remote Sensing and Machine Learning to Support Pollinators in North Dakota
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The recent declines in both wild and managed pollinators drawing widespread public attention, have been associated with rapid land use changes which directly impact the availability of forage resources for pollinators. However, little is known regarding the current forage status, floral coverage, abundance, blooming location, species, and blooming window of this critical ecosystem resource, due to data limitations and a lack of advanced research tools. This study aims to evaluate pollinator habitat and forage quality in the North Dakota grasslands by detecting, and mapping pollinator friendly floral species and their flowering windows. This will be achieved through the development of a novel machine learning algorithm that harnesses the power of high-resolution satellite imagery in terms of their temporal, spatial and spectral characteristics. Hosting over 500,000 honeybee colonies seasonally that provide ecosystems services nationwide and being the top honey producer in the US, this study is essential for pollinator conservation efforts in North Dakota.

147	Rodrigo Amorim	Music	José Siqueira and His Music: From the Northeastern of Brazil to the World
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The rich repertoire of Brazilian music is frequently performed and studied in Brazil and abroad. Mistakenly, Southeastern Brazilian composers such as Heitor Villa-Lobos and Alberto Nepomuceno are overrepresented, leaving behind an enormous portion of unknown composers. Among them is José Siqueira from the Northeastern state of Paraíba, who was a famous composer, conductor, and educator during his lifetime and to whom the inclusion of Northeastern music into Brazilian concert music can be credited. The main objective of this study is to present José Siqueira and how he utilized musical elements from Northeastern folklore, native Brazilian culture, and popular urban musical traditions in his work from the perspective of the Brazilian nationalist movement of the first half of the 20th century. By illuminating Siqueira's legacy, this project aims to enhance recognition of Brazil's unique musical heritage and elevate lesser-known composers within the Brazilian repertoire.

Poster	Presenter	Program	Abstract Title
148	Charles Kporxah	Energy Engineering	Novel Methods to Increase Carbon Mineralization Rates

Anthropogenic emissions of greenhouse gases, including carbon dioxide (CO₂), methane, chlorofluorocarbons, and nitrous oxide, are driving global warming. CO₂ alone contributes to about 79% of surface warming. Various strategies have been devised to combat this, one being carbon mineralization, where CO₂ is converted into solid mineral forms like carbonates, mimicking natural weathering processes. However, natural weathering is too slow to counteract warming effectively. This research aims to accelerate mineralization using industrial wastes like steel slag and fly ash. By doing so, the goal is to develop a cost-effective and scalable solution to mitigate climate change. This approach seeks to utilize abundant industrial by-products to sequester CO₂, thereby addressing the root cause of global warming and preparing for climate change impacts.

149	Matthew Evans	Counseling Psychology	A Constructivist Grounded Theory Study of TGD Youth's Utilization of Video Game Avatars during Identity Development
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This proposed study aims to develop a greater understanding of the ways in which transgender and gender diverse (TGD) youth utilize video game avatars for identity development. A constructivist grounded theory (GT) qualitative method will be used to gather and analyze detailed data on the meaning that TGD youth may derive from the avatar creation process in role-playing video games (RPGs). The current study will recruit 10 TGD young adults via online LGBTQIA + support networks and local community organizations. Participants will complete individual semi-structured interviews consisting of predetermined open-ended prompting questions regarding their experiences creating avatars in RPGs. Additional follow-up questions will be used to enrich the data after each prompt. Recorded interview transcripts will undergo 3 phases of coding (initial, focused, and theoretical) by a research team consisting of the principal investigator, 4 trained coders, and an auditor. A finalized grounded theory and its implications will be discussed.

150	Sanmi Odeyemi	Earth System Science & Policy	Automating Drought Stress Assessment in Vegetation Areas Using Normalized Difference Moisture Index (NDMI)
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Drought analysis using remote sensing offers insights into climate change mitigation. Using the Normalized Difference Moisture Index (NDMI) from satellite imagery, this study assesses vegetation moisture stress in Fremont County's Wind River Division, Wyoming. NDMI aids precision agriculture by identifying moisture-stressed farmland for targeted irrigation. The study aims to develop a Python-based algorithm and model that seamlessly automates NDMI analysis, identifies vegetative areas experiencing moisture stress, and assesses the level of stress in Esri ArcGIS Pro software. The algorithm successfully automated analysis, resulting in maps and statistical summaries. Maps for 2013, 2017, 2020, and 2022 show extensive moisture stress in 2013 and 2020 compared to 2017 and 2022. NDMI difference maps identify stress or improvement areas between years. Moisture-stressed areas measured 243,176 ha (2017-2013), 246,313 ha (2020-2017), and 248,466 ha (2022-2020), while improved areas were 38,605 ha, 35,465 ha, and 33,309 ha, respectively.

151	Richard Hoberg	Educational Foundations & Research	Comparing factors influencing rural school reorganization in North Dakota
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North Dakota's rural schools face significant challenges. For some this includes the challenge of continuing to exist, in service to their communities. Since the year 2000, the number of North Dakota school districts has reduced by over 27% (from 231 down to 168) through the processes of reorganization, annexation, and dissolution. The leading cause of this trend has historically been thought to be declining enrollment, but many other relevant factors are known. The purpose of this study is to identify and quantify factors influencing reduction of districts in North Dakota. Using document analysis and interviews of districts that have reorganized or closed since 2012, this study uses comparative case study methodology to identify, analyze and compare all influential factors. Comparing declining enrollment alongside other factors will offer a better account of what is causing school district reduction in North Dakota and assist others in addressing it.

152	Rockson Aluah	Petroleum Engineering	A Blend of Eggshell Particles and North Dakota Fly Ash for Enhancing the Geomechanical Stability of Class G Cement in Subsurface Hydrogen Storage System
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The rise in greenhouse gas emissions is compelling nations worldwide to implement measures to mitigate climate change. The utilization of large geological formations, such as depleted oil and gas reservoirs, salt caverns and saline aquifers, for hydrogen storage offers an opportunity for long-term sustainable energy solutions, thereby aiding the advancement of a low-carbon economy. In the process of geological storage, hydrogen is injected and withdrawn via wells that are cemented and cased. Effective cementing is crucial in this context to ensure the integrity of wells and the sealing ability of underground hydrogen storage (UHS), thus preventing gas leakage and ensuring long-term. This research investigates the effect of fly ash and eggshell power (FAESP) additives on the mechanical and sealing properties of Dyckerhoff class G cement intended for underground hydrogen storage (UHS). Particle size distribution, SEM, and XRF analyses were used to characterize the cement powder, fly ash, and eggshell power. ... (abstract truncated)

Poster	Presenter	Program	Abstract Title
153	Amrit Regmi	Chemistry	Hypoxia-Responsive PEGylated Prodrugs of Anticancer Drugs Doxorubicin and SN-38 for Cancer Treatment

Developing efficacious drug delivery systems for targeted cancer chemotherapy remains a major challenge. Doxorubicin and SN-38 are effective anticancer drugs that have been used for the treatment of various cancers. However, their clinical use is limited by the severe toxic side effects and low bioavailability. Here we demonstrate new hypoxia-responsive prodrug formulations of the two drugs, which consist of the drug molecules, an aromatic azo group (Ar-N=N-Ar), and a polyethylene glycol (PEG) chain. The azo group has been proven to be an effective functional group that can respond to hypoxia. It can be cleaved through a reduction reaction catalyzed by an enzyme azoreductase under hypoxic conditions. Therefore, it has been utilized to modify anticancer drugs to produce hypoxia-responsive prodrugs, thus improving their cancer-targeted therapeutic effects. PEG is one of the most widely used hydrophilic polymers with negligible toxicity and low immunogenicity, which has been used to increase the bioavailability of hydrophobic drugs while introducing no extra toxicity. ... (abstract truncated)

154	Nishat Sultana	Public Health	Interpersonal violence during pregnancy partially mediates the association between Adverse Childhood Experiences and postpartum depression
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Adverse Childhood Experiences (ACEs) may predict Postpartum Depression (PPD) however, Interpersonal Violence (IPV) may lie on the pathway between ACEs and PPD. Studies examining IPV as a potential mediator in the relationship between ACEs and PPD are lacking. To address this, this study examined the association between ACEs and PPD, potentially mediated by IPV, among 3,016 individuals from the North Dakota Pregnancy Risk Assessment Monitoring System. Mediation models were fit using SAS PROC CAUSALMED, accounting for demographic factors and survey design. Result shows IPV accounts for a small, yet meaningful, percentage of the association between ACEs and PPD. The total effect of high ACEs was associated with a 95% increased risk of PPD. Mediation models suggest IPV accounts for approximately 10% of the effect of ACEs on PPD. These data warrant consideration among perinatal and mental health professionals to better recognize risk factors for PPD.

155	Derrick Seubert	Mechanical Engineering	Current Status on the Design and Development of Ice-Phobic Materials
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In the pursuit of enhancing the durability and safety of critical infrastructure in cold and icy environments, the development of ice-phobic materials has gained significant attention recently. This poster presentation delves into the advancements in ice-phobicity test stands we are making at UND, shedding light on their pivotal role in materials research. Our research addresses the need for reliable and standardized methods to evaluate the ice-phobic properties of materials. We are exploring novel designs and testing protocols that encompass a wide range of environmental conditions, ensuring a comprehensive assessment of materials and surfaces but also enable the optimization of existing materials for diverse applications, such as aircraft components, renewable energy, power transmission lines, and transportation infrastructure. Additionally, we discussed the integration of state-of-the-art instrumentation and automation techniques into these test stand, enhancing precision and repeatability.

156	Andrew Maynor	Earth System Science & Policy	Assessing the application of a spatial multi-criteria analysis framework to evaluate energy resource availability for local or community micro-grids in rural Sub-Saharan Africa
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Energy poverty, the lack of access to affordable, reliable and modern energy services including access to electricity and clean cooking facilities, affects more than 2.5 billion people globally, with many living in Sub-Saharan Africa. Having access to reliable, sustainable energy is a key factor in economic development and human health. Our objective is to determine viable and sustainable electrification options for rural communities in Ghana that currently lack access to electricity. We will evaluate the feasibility of a spatial multi-criteria analysis shell to prioritize the use of off-grid renewable energy by determining the quality and quantity of energy resources available for electricity production. Our goal is to provide local-scale data on various generation options and provide local leaders with a tool to determine the most cost-efficient electrification options. This process could act as a model in alleviating energy poverty and supporting future development efforts in other regions.

Poster	Presenter	Program	Abstract Title
157	Nicholas Baldwin	English	Kerouac's Spontaneous Poetics in Letters

This investigation analyzes Jack Kerouac's pre-On the Road letters, claiming them as literary works. Despite Kerouac's renown as a Beat Generation icon, his letters have been overlooked in literary discourse. By analyzing five letters from Selected Letters, 1940-1956, the research illuminates Kerouac's unique approach to spontaneity: repetition, and language, revealing a deliberate poetics of mindful control before the publication of his best-known work. These letters serve as artistic expression and offer insights into Kerouac's creative process. Intersections of literature, the study of self, and the context of what it means to be "American" amid the wider abstract-expressionist movement in postwar America are called into question. The letters indicate a writer's approach to an under-served literary form: the epistle. Through a nuanced examination of Kerouac's spontaneous poetics and the art of letter writing, the intention is to underscore the significance of Kerouac's correspondence as an underappreciated form of literary expression.

158	Md Fakir	Biomedical Engineering	Effects of Alternating Air Support Surfaces on Sacrum Blood Flow: A Clinical Study with Diverse BMI Populations
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Pressure injuries pose a significant healthcare dilemma with considerable clinical and economic burden. In this clinical study involving 29 young adults with diverse Body Mass Index (BMI) levels, we evaluated the effects of three support surfaces (foam, gel and alternating pressure) on sacrum blood flow which are being used in operating room (OR) with the aim of understanding their potential role in preventing pressure injuries. Our findings indicated a significant increase ($p < 0.05$) in blood flow after 2 hours on each surface, suggesting their influence on microcirculation. Interestingly, the alternating air support surfaces (AASS) exhibited a significantly lower increase in blood flow compared to foam in participants with a normal BMI ($p < 0.05$), underscoring the importance of considering individual BMI when selecting support surfaces for pressure injury prevention.

159	Yingfen Wu	Chemistry	Fe ³⁺ - doped Graphene Quantum Dots based Nanozymes for Detection of H ₂ O ₂
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Hydrogen peroxide (H₂O₂) as an oxidizing agent can have a detrimental effect in numerous biological processes. The H₂O₂ quantification is critical in cellular systems and waiting to be improved. This work reports synthesis and characterization of novel graphene quantum dots (GQDs-Fe) as promising nanoprobe for sensitive H₂O₂ sensing. The GQDs-Fe synthesized exhibit small size (< 4 nm) and zeta potential (~ 10 mV), and high quantum yield (67%), exceeding parameters for typical GQDs (10-20%). The redox reaction between Fe (III) ion and H₂O₂ leads to a selective decrease in fluorescence intensity of GQDs-Fe, enabling robust H₂O₂ concentration detection. Optimizing reaction time, pH and GQDs-Fe concentration enhanced the sensitivity, with a low limit of detection of 20 nM achieved. This work demonstrates the potential of GQDs-Fe for sensitive detection of H₂O₂, opening avenues for potential applications in biomedical research and environmental monitoring.

160	Lacey Anderson	Educational Foundations & Research	Diversity in Food and Agricultural Programs: Learning from graduate students of color
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The purpose of this qualitative research is to investigate the ways race, ethnicity, and cultural background influence educational goals and career aspirations for graduate students of color in Food and Agricultural programs. Face-to-face interviews were conducted with students in Alabama, California, Florida, and North Carolina. Participants discussed their early experiences that influenced their decision to enroll in Food and Agriculture degree programs and their current experiences as graduate students including supports and barriers they encountered. Participants were also asked to "dream big" regarding what they would implement in their communities to help increase minority access to the field of Food and Agriculture. The goal of the project is to inform university and industry leaders about the experiences of students of color and to better serve students in these programs by understanding the way race, ethnicity, and cultural background may affect students in these programs.

161	Temitayo Ikuero	Energy Engineering	Study of the Stability and Redox Behavior of an Iron-based Perovskite
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The stability and thermochemical reduction and oxidation (redox) behavior of an iron-based Perovskite material were investigated to evaluate its potential in water and CO₂-splitting processes, a pivotal step for the advancement of material development for hydrogen production. To assess the redox activity of the material, thermogravimetric analyses were performed, followed by X-ray diffraction tests to assess the stability of the material. The results reveal the promise of iron-based Perovskites in hydrogen production. This research contributes to the ongoing efforts aimed at enhancing sustainable energy generation via carbon-free fuels.

Poster	Presenter	Program	Abstract Title
162	Bernard Frempong	Biomedical Sciences	Yersinia pestis drives the development of an alternatively activated macrophage phenotype in an in vitro infection model

Macrophages significantly contribute to the pathogenesis of plague. *Yersinia pestis*, the bacterium responsible for the plague, selectively targets macrophages early in the infection process to create an intracellular niche that facilitates its survival and proliferation. This study focused on identifying the macrophage phenotype that *Y. pestis* induces at the initial stages of infection. Using an in vitro infection model, the research investigated how *Y. pestis* affects macrophage polarization and cytokine production. The findings revealed that *Y. pestis* encourages the development of an alternatively activated macrophage phenotype (M2), marked by the production of anti-inflammatory cytokines such as IL-4, IL-10, and IL-13. Additionally, it was observed that *Y. pestis* suppresses the release of pro-inflammatory cytokines like IL-6, IL-8, TNF- α , and IFN- γ . These insights contribute to a deeper understanding of the strategies *Y. pestis* utilizes to circumvent host immune responses and establish infections.

163	Percy Kpodo	Educational Foundations & Research	International Student Experiences in Native English-Speaking Countries: Postgraduate Motivations and Realities in the US
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This study seeks to improve the understanding of the experiences of international students in native-English-speaking countries by focusing on postgraduate-level students at a selected university in the United States. Conceptual framework: Push-pull model, McMahon (1992). Following a phenomenological viewpoint, in-depth semi-structured interviews/ protocol. Seven students will be interviewed to get more information about their motivations and expectations for studying abroad, as well as the challenges they have encountered.

164	Adewale Ajao	Civil Engineering	Sorption Behavior of Pfas on Concrete
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During fire training exercises in airports, concrete is exposed to Aqueous film-forming foam (AFFF) solutions that contain PFAS. The objectives of this study include investigating the adsorption, desorption, and leachability behaviours of PFAS in concrete media under various environmental conditions. High-strength Concrete, early-strength concrete, air-entrained concrete, and polymer concrete, with adequate compressive and flexural strengths, will be made and investigated to understand their PFAS sorption behaviour under controlled laboratory conditions. Concrete aggregate and materials would be varied to contain fly ash, slag, superplasticizers, nanomaterials, volcanic pumice powder (VPP), and polypropylene in different concentrations. An AFFF solution, containing PFAS would be the experiment medium. PFAS analysis would be done using the Liquid Chromatography Mass Spectrometry. The result of this experiment would improve the understanding of the fate of PFAS in concrete.

165	Abiola Sholarin	Biomedical Sciences	SEI combination therapy with HPV-E7 peptide induces survival of HLADQ8 mice with established carcinoma
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Cervical cancer is caused by persistent infection with human papillomavirus (HPV). Recurrent HPV infection results in synthesis of the HPV E7 protein in cervical epithelial cells and E7 is a putative therapeutic target for cervical cancer, with modest success. We have previously demonstrated the immunotherapeutic efficacy of Staphylococcal superantigens, SEG and SEI, for established murine melanoma in humanized HLA-DQ8 tg mice. Here we investigated the immunotherapeutic potential of SEG or SEI with or without exogenous E7 peptide in HLA-DQ8 tg mice with established TC-1 cancer cells expressing both HPV E6 and E7 peptides. We demonstrated that post-tumor engraftment, SEI + E7 treatment completely ameliorated the cancer, 100% survival rate observed 80+ days after tumor engraftment, significantly better than untreated controls, and markedly improved over other SEG or SEI/E7 combinations. This suggests the potential of SEI as an immunotherapeutic for established cervical carcinoma.

166	Randy Perkins	Educational Foundations & Research	Faculty Opinions and Experience with ChatGPT at a Tribal College in Minnesota
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The arrival of ChatGPT in November 2022 changed college composition forever. It soon became invaluable to students suddenly benefitting from improved grades, prompting a national debate on plagiarism, and writing itself, in its wake. For indigenous students already facing disproportionate challenges in academic preparedness, enrollment, and retention, ChatGPT poses significant opportunities and risks for individual empowerment. To initiate discussion of ChatGPT policy and practice where I teach, a small Tribal college in Minnesota, I conducted a qualitative study to explore current faculty opinions and experience with the tool. Data was collected via semi-structured interviews (Robson & McCartan, 2016) which were recorded, transcribed, and coded for analysis following Saldăna (2017). The results show a critical knowledge gap among faculty interviewed preventing meaningful contribution to policy formulation and practice, implying a need for foundational education in the capabilities and ethical use of such tools. This study may benefit institutions undergoing similar transitions.

Poster	Presenter	Program	Abstract Title
167	Ashraf Al-Gorae	Biomedical Engineering	Development of Tunable Hydrogel Framework for In-Vitro Studies

Optimal material design is intricately linked to the degree to which the chosen biomaterial closely mimics the properties of the natural extracellular matrix, with a primary emphasis on both its biological and physicochemical characteristics. Adaptive three-dimensional (3-D) biomaterials, such as hydrogels, are an excellent candidate as they provide many appealing features for 3-D cell culturing. In this work, an interpenetrating polymer network was developed via physical crosslinking of synthetic and bio-based polymers. As a preliminary outcome, a straightforward and reproducible process to synthesize a stiffness tunable hydrogel was developed. The results of the parametric study showed that the stiffness in terms of elastic modulus is dependent on the freezing temperature, thawing temperature, concentration of polymers, and number of freezing/thawing cycles. The analyzed parameters will be employed to optimize the tunability of the hydrogel and relate this tunability to the design requirements of the 3D cell culture.

168	Ashan Fernando	Physics	Exploring the biointerfaces: ab initio investigation of nano-montmorillonite clay, and its interaction with unnatural amino acids
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We investigated the interaction between biomimetic Fe and Mg co-doped montmorillonite nanoclay and eleven unnatural amino acids. Employing three different functionals (PBE-GGA, PBE-GGA + U, and HSE06), we examined the clay's structural, electronic, and magnetic properties. Our results revealed the necessity of using PBE - GGA+U with $U \sim 4$ eV to accurately describe key clay properties. We identified amino acids that strongly interacted with the clay surface, with steric orientation playing a crucial role in facilitating binding. Our DFT calculations highlighted significant electrostatic interactions between the amino acids and the clay slab, with the amino group's predominant role in this interaction. These findings hold promise for designing amino acids for clay-amino acid systems, leading to innovative biomaterial composites for various applications. Additionally, our ab initio molecular dynamics simulations confirmed the stability of clay-amino acid systems under ambient conditions, and the introduction of an implicit water solvent enhanced the binding energy of amino acids on the clay surface.

169	Alva Lindstroem	Geography	Spatial Analysis of Housing Affordability
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Through a longitudinal study into spatial distribution of affordable housing and value development in Grand Forks I seek to lay the groundwork for my thesis, researching the potential effects of studentification in near-campus neighborhoods. The correlation between cheaper, older, single-family housing being transformed into rentals for multiple occupants is yet to be established, however the mapping and identification of housing affordability should provide preliminary insight into the potential issue of gentrification in neighborhoods of single-family households. By employing GIS software, this study seeks to discern potential trends in affordability. The COVID-19 pandemic significantly impacted housing markets, with increased demand and limited supply leading to soaring prices. While homeowners benefited, younger generations and marginalized groups faced challenges accessing the housing market, highlighting the importance of fair and affordable housing policies. This research contributes to understanding of urban contexts and addresses the pressing issue of housing affordability amidst changes in housing dynamics.

170	Imteaz Osmani	Mechanical Engineering	Experimental Investigation of Levitated Microdroplets for Understanding Chain Crystal Aggregates Observed in Atmospheric Clouds
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The formation of atmospheric ice crystals from aerosol particles or super-cooled droplets is poorly understood, particularly the processes of ice nucleation and crystal aggregation. This lack of understanding hampers the incorporation of these processes into atmospheric cloud models. To address this, researchers combine aircraft observations of chain-like ice crystal aggregates in cirrus clouds with controlled laboratory studies. Using a microparticle levitation technique, a dual electrodynamic trap with a custom cooling system is used to produce ice crystals without physical interference. By manipulating parameters such as joining area, surface charge, and thermodynamic conditions, the aggregation process will also be investigated. Silver iodide is utilized for its ice nucleation efficiency under atmospherically accurate conditions. This approach enables the generation of atmospherically accurate ice crystals and aggregates, enhancing the understanding of chain-like ice crystal formation in atmospheric clouds.

Poster	Presenter	Program	Abstract Title
171	Eugene Oga	Chemistry	Method Development: Polyurethane Self-degradation Analysis by Evolved Gas Analysis and Pyrolysis Gas Chromatography-Mass Spectrometry

This work outlines a combination of two methods, evolved gas analysis with mass spectrometry (EGA-MS) and thermal desorption pyrolysis gas chromatography with mass spectrometry (TD-Py-GC-MS) to investigate the aging of polyurethanes. First, EGA-MS was used to screen temperature profiles for each sample. This step provided insights into temperature programming steps to use TD-Py-GC-MS to study the mechanism of the degradation process (i.e., aging), which occurs in aliphatic PUR foams. The slightly differing pyrolytic profiles were obtained depending on aging corresponding to changes in the material texture and/or possible changes in the extent of cross-linking which were accounted for by loss of additives as aging increased.

172	Darian Sherva	Teaching & Leadership	Why are teachers leaving the classroom?
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Teachers are leaving the classroom at alarming rates across the United States. The leaky bucket and revolving door of education have been around for over a decade. Specifically in North Dakota, one in three teachers leaves the profession within their first five years of teaching (Exec. Order No. 2023-08, 2023). The literature review presentation shares what research has found to be reasons for teacher turnover and how future research can help. Specific strategies in response to the status of the teacher workforce are creating competitive and equitable compensation, enhancing the supply of qualified teachers targeted to high-need fields and locations, improving teacher retention, and developing a national teacher support market.

173	Yasser Ahmed	Biomedical Engineering	Adaptability and Energy Return: Key Features of a New Sacrificial Boot Design for Astronauts
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This project aims to develop a mobility assistance device to enhance the safety of astronauts as well as their efficiency during lunar voyages. The part has the role of being a removable, sacrificial part to be attached at the bottom of the space boot, aiming to address the singular challenges posed by lunar regolith. Through a methodical step by step process, the project first needed a deep understanding of the dangers associated with lunar regolith, which include its sharpness, magnetic properties, radioactivity, minuteness, and invasiveness. After that, a 3D modeling software was included (Autodesk Inventor), that resulted in the generation of three initial concepts and systematically analyzing points of failure to refine the design. The finalized design made after using all three designs as inspiration, was presented to NASA executives, emphasizing adaptability for moon walks, energy return, and sacrificial protection against regolith-related hazards. ... (abstract truncated)

174	Chiranthi Mahadurage	Chemistry	BODIPY Endcapped Hyperbranched Poly(Silyl Ether) Nanoparticles for Photodynamic Therapy and Fluorescence Imaging.
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Hyperbranched poly(silyl ether)s are a new class of three-dimensional polymers with extremely branching structures. They possess intriguing physical and chemical properties, including intramolecular cavities, and an abundance of surface functional groups, due to their distinct structural features. As a result, the biomedical field has greater potential for applying these cargo transportation carriers made of hyperbranched polymers. Photosensitizers are covalently added into hyperbranched polymers when used in photodynamic treatment to increase therapeutic efficacy by enhancing the polymers' solubility, stability, and targeting efficiency. When it comes to treating malignancies photodynamic therapy (PDT) has shown potential. PDT's method of action depends on light, photosensitizer, and oxygen. It has been shown that BODIPY is an extremely effective fluorescence imaging agent and photosensitizer. Our research interest has been focused on covalently attaching BODIPY dyes to the hyperbranched polymer and apply as a nano system for the treatment of cancer.

175	Allyse Dunnigan	Teaching & Leadership	Practices of North Dakota vocal music educators with exemplary implementations of culturally responsive education
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Despite calls for the inclusion of multiethnic, multicultural, and world music into school curriculums, Western European music remains the majority of music taught to students in the United States. This qualitative study's intent is to interview four to six secondary vocal music teachers currently teaching in North Dakota who are exemplary in the field of teaching world music or with culturally responsive techniques. Once all interviews are completed, the techniques used by exemplary teachers will be examined for commonalities amongst those teachers and compared to the tenets of culturally responsive pedagogies. This researcher hopes to share those successful techniques with other vocal music educators.

Poster	Presenter	Program	Abstract Title
176	Hesham Abdelaziz	Chemical Engineering	From Lab to Field: Understanding and Dissolving Oil and Gas Scales with Eco-Friendly Solutions

This study addresses the persistent challenge of scale deposition in the oil and gas industry, it investigates the scaling process and aims to assess diverse scale dissolvers. This should be achieved by collaborating with the North Dakota Oil and Gas Division. Our flow loop replicates real-scale formations experimentally, to provide refined insights into scale kinetics varying in conditions. Through systematic control of parameters such as flow rate, fluid concentration, temperature, pH, and brine concentration, the aim is to understand scaling processes comprehensively. The study continually evaluates the effectiveness, dissolution rates, and potential corrosion of scale dissolvers, while considering environmental impact for practical applications. Despite technical challenges, successful experiments generated calcium carbonate scale deposits, with ongoing efforts to extend run times. The findings offer insights into scale deposition and dissolution, that hold promise for advancements in pipeline operations. ... (abstract truncated)

177	Zachary Bailey	Chemistry	Poly(silyl ether)-Based Nanoparticles for Use as Potential Nanocarrier
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Polymeric nanoparticles present a method of cancer treatment through the selective targeting and controlled release of drugs. Poly(silyl ether)'s (PSEs) based nanoparticles show promising use due to the hydrolytic degradation of the Si-O-C bond present in the molecule. In the current study, we have prepared and characterized a series of PSEs from polyethylene glycol (PEG) based diols and PSEs-based nanoparticles. The encapsulation and subsequent release of payload by these nanoparticles are being studied and optimized.

178	Anne Nickell	Clinical Psychology	Alcohol Use, Childhood Maltreatment, and Sexual Victimization in College-Aged Men
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Alcohol is a major risk factor for sexual victimization (SV), as well as a consequence of it. Research shows that men with a history of childhood maltreatment (CM) and SV have higher alcohol consumption and problematic drinking behaviors. Victimization and alcohol-related histories were assessed in 388 college-aged men for this study. Data shows 23.5% of participants reported SV since age 14, 6% reported experiencing childhood sexual abuse (CSA) before age 14, and 45.6% reported any experience of CM. Men reporting a history of SV reported more instances of CSA than those without, as well as more instances of CM than those without. Men with a history of CM had fewer risky alcohol use behaviors than those without. The results of this study will inform the development of prevention and/or intervention programs for college men – including those that focus on CM, CSA, SV, and alcohol as it relates to these histories.

179	Toluwase Omojiba	Energy Engineering	Assessing Energy Security in the United States: Dimensions and Indicators from 2015 - 2021
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This study delves into the critical issue of energy security, particularly focusing on the United States from 2015 to 2021. It identifies five key dimensions: Energy Independence, Availability, Resilience, Affordability, and Environmental Sustainability. Using 25 indicators sourced from various reputable organizations, including the EPA, EIA, IEA, and The World Bank, an energy security index score is calculated for each dimension. The indicators are normalized and equally weighted to provide scores on a scale of 0 to 1. The overall energy security index score for the US is derived from the average of these dimension scores. The findings reveal a generally improving trend in US energy security over the period studied, with notable strengths in energy availability and independence. The highest energy security score was recorded in 2021, indicating an overall positive trajectory in the nation's energy security landscape.

180	Roland Lemlack Londe	Chemistry	Investigating the Presence of Per- and Polyfluoroalkyl Substances (PFAS) in Window Installation Materials
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Per- and polyfluoroalkyl substances (PFAS) are a broad group of man-made chemicals that have been used as ingredients in consumer products around the world. The manufacturing and use of certain PFAS termed "Forever chemicals" such as perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) have been stopped due to concern from regulators as they have been proven to be detrimental to the environmental and humans, yet there are still thousands of PFAS in use, which are difficult to identify and quantify. This work uses two step thermal methods; evolved gas analysis-mass spectrometry (EGA-MS) and thermal desorption-pyrolysis-gas chromatography mass spectrometry (TD-Pyr-GC-MS) to investigate the presence of PFAS in window installation materials. EGA-MS has yielded temperature profiles between 150 °C to 800 °C. These profiles will enable us to develop a temperature program for further TD-Pyr-GC-MS analysis.

Poster	Presenter	Program	Abstract Title
181	Stacey Skarperud	Teaching & Leadership	Navigating the Role of Professors in Supporting Students' Mental Health

The subject of mental health and well-being has gained significant attention over the past decade. "According to the National Institute of Mental Health (NIMH), one in five adults living in the United States has a mental illness (2022)" (Eccleston, 2023). If you are a professor employed by a higher education institution, there is a strong likelihood that you will encounter students in your courses affected by mental health. "The Centers for Disease Control and Prevention (CDC, 2021) defines mental health as including our emotional, psychological, and social well-being and how those factors influence how we think, feel and act" (Eccleston, 2023). This presentation will review the literature on the professors' role in supporting students with mental health issues, time constraints, workload impact, disclosure issues, and maintaining professional boundaries.

182	Rachael Josephs	Energy Engineering	Hydrogen Production & Storage Technologies: A Feasibility Study Integrating Distributed Hydrogen Production via Biomass Gasification with Subsurface Storage in North Dakota
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Hydrogen has emerged as a clean energy alternative, valuable across various sectors of the economy. However, conventional methods for hydrogen production such as methane reforming, emit large amounts of carbon dioxide to the atmosphere informing a push for cleaner and more environmentally sustainable production technologies. Furthermore, for hydrogen to be deployed at scale, there is a need for effective and low-cost storage given the low volumetric density of hydrogen. Subsurface storage has emerged as a widely advantageous method, providing safety and reliability for the stored gas (in gigawatt-hours). In this study, a specified biomass feedstock is gasified to produce clean hydrogen, which is then processed and conveyed to a designated subsurface location for subsequent storage. The objective of this research is to evaluate which combination of biomass gasification, gas cleanup and storage results in the lowest LCOH AND LCOS. We also determine the critical factors that affect LCOH the most.

183	Riswat Mubsau	Chemistry	Synthesis of Amphiphilic Polyesters via Zinc Catalyzed Ring-Opening Copolymerization Reaction of Tetrapropenyl Succinic Anhydride and PEG Functionalized Epoxide: Self Assembly to Polymeric Micelles for Drug Delivery
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Polymeric micelles have captured significant interest as a promising method for drug delivery because of their unique core-shell structure. This structure makes them water soluble while also providing a hydrophobic core, which is ideal for carrying hydrophobic drugs. This is important because many drugs have low solubility in water and loading them into drug carriers like polymeric micelles can enhance their solubility. This study discusses the formation of an amphiphilic polyester by reacting tetrapropenyl succinic anhydride (TPSA) and functionalized polyethylene glycol methyl ether. This polymer can self-assemble to form micelles with a TPSA tail acting as a hydrophobic core and functionalized epoxide acting as a hydrophilic segment. The effect of reaction parameters such as monomer concentration, catalyst activity, reaction time, and yield were examined using NMR spectroscopy (¹HNMR & ¹³CNMR).

184	Katy Ries	Teaching & Leadership	Working Conditions and Teacher Burnout
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Today, the United States is facing a mass exodus of educators leaving the field, if low pay has always been a factor, then why is the U.S. education system seeing an increase of teachers leaving the field? This research is taking a closer look into how working conditions contribute to an educator's decision to leave the field. Specifically, working conditions related to admin support and learner behavioral theory.

185	Nadhem Ismail	Chemical Engineering	Carboxyl-Engineered Silicon Quantum Dots (CSiQDs) as an Efficient Scale Inhibitor: Formulation Inhibition Mechanism
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Multiple recent initiatives have focused on developing environmentally friendly antiscalants/scale inhibitors; however, most of the investigated green antiscalants have demonstrated low scaling ion tolerance and unknown underlying scale inhibition mechanisms. Novel fluorescent green antiscalants, due to their fluorescence properties, appear to be among the best solutions since they both solve critical environmental issues and offer insights into the inhibition mechanism. In this work, the surface of synthesized SiQDs was engineered by introducing carboxyl moieties. The functionalized /surface engineered Carboxyl Silicon Quantum Dots (CSiQDs) were characterized in terms of FTIR, XPS, HRTEM, DLS, zeta-potential, and fluorescence properties. The characterization results confirmed successful functional tailoring through the introduction of carboxyl groups while retaining excitation and emission properties. The performance of the engineered CSiQDs was evaluated using calcium sulfate scale at different brine stresses, temperature, and pH. The results revealed the exceptional high efficiency of the CSiQDs, reaching 100% at a 20 ppm dosage in a brine containing 6,600 ppm of calcium and sulfate ions at 70 °C. ... (abstract truncated)

Poster	Presenter	Program	Abstract Title
186	Navodi Rodrigo	Geography	Vehicle Crashes in Minnesota: Spatiotemporal Patterns and Contributing Factors

This study investigates vehicle crashes in Minnesota, employing spatial techniques and ordinal logistic regression to identify hotspots and analyze contributing factors for crash severity. Spatial analyses like Global Moran I, Getis-Ord G_i^* , and Kernel Density Estimation reveal crash hotspots near metropolitan areas. Ordinal Logistic Regression identifies factors influencing crash severity, highlighting distinctions such as female drivers being more susceptible to fatal crashes than males. Surprisingly, snowy, or rainy weather is associated with less severe crashes than clear conditions. These findings aid in developing a robust crash model to mitigate the socio-economic impact of fatal accidents. Implementing targeted interventions in identified hotspots, as well as weather-specific safety measures, can enhance road safety, contributing to the overarching goal of achieving zero fatalities and injuries. This research provides valuable insights for policymakers, enabling the creation of a safer road environment in Minnesota.

187	Sonia Tudjeu Chendjou	Chemistry	Forensic Analysis of Cocaine and Benzodiazepines in Insects for the Determination of Post-Mortem Interval
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More than 106,000 persons in the U.S. died from drug-involved overdose in 2021, including illicit drugs and prescription opioids such as cocaine and benzodiazepines. In cases of homicide and suspect death, the estimation of postmortem interval (PMI) which represents the time elapsed since death and body discovery, is crucial and usually involves the use of insects when human tissues are severely decomposed, or inadequate for sampling. In this work, we aimed to develop an analytical method for the estimation of the postmortem interval (PMI) based on the fate of cocaine and benzodiazepines in insects (blowfly larvae and puparia). This will be achieved by determining their concentrations in these insects using gas chromatography mass spectrometry (GC-MS) and high-performance liquid chromatography/time of flight mass spectrometry (HPLC/TOF-MS).

188	Sherry Zeng	Counseling Psychology	Preliminary Data Analysis: Childhood emotional maltreatment, emotion regulation, and adult romantic relationship satisfaction among ethnic minorities
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The quality of romantic relationships significantly influences individuals' well-being, such as mortality risk, self-esteem, and emotional state (Lev-ari et al., 2021; Rosand et al., 2012). Prior research suggests a negative association between childhood emotional maltreatment (CEM) and later romantic relationship satisfaction, with emotion regulation processes mediating this relationship (Bradbury & Shaffer, 2012). However, existing studies primarily focus on the White American population, leaving a gap in understanding these experiences among ethnic minorities. To bridge the literature gap, this project collected data online to examine whether interpersonal and intrapersonal emotion regulation would mediate the link between CEM and romantic relationship satisfaction among ethnic minority individuals. Using Structural Equation Modeling, preliminary data analysis indicated that the hypothesized mediating role of emotion regulation on the relationship between CEM and relationship satisfaction is not supported. However, the analysis reveals a significant negative association between CEM and both relationship satisfaction and emotion regulation.

189	Luc Nkok	Petroleum Engineering	Machine Learning tool for Accurate Analysis of Petrophysical parameters of Carbonate Reservoir Madison Group Formation as Case Study
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This study utilizes machine learning to enhance the accuracy of petrophysical parameter predictions crucial for oil and gas field development. Wireline measurements often face errors, impacting hydrocarbon reserve accuracy. Employing well logs and special core analysis data from the Little Knife field, the focus is on a carbonate reservoir in the Madison group formation. Eleven well logs serve as independent variables, and core analysis provides data for grain density, permeability, porosity, and water saturation. Machine learning models, including Random Forest regression, Decision tree regression, XGBoost, and K-nearest neighbor, are trained on these datasets. Results show XGBoost excelling in predicting water saturation and porosity (R^2 : 96%, RMSE: 5.5, MAE: 2.3) while K-nearest neighbor outperforms in permeability prediction (R^2 : 65%, RMSE: 0.6, MAE: 0.17). These findings demonstrate the potential of machine learning in refining petrophysical parameter predictions for improved reservoir characterization.

Poster	Presenter	Program	Abstract Title
190	Michael Allen	Biomedical Sciences	Functional Characterization of the Taurine Transporter Variant Ala294Thr and Its Link to Human Disease

The taurine transporter (TauT) is important for the proper homeostasis of taurine, a widely distributed amino acid critical to human health. Previously, we identified a TauT variant (Gly399Val) with diminished taurine transport that resulted in heart and retinal pathologies which were reversed or stabilized, respectively, using dietary taurine supplementation. Our current study focuses on a TauT mutant (Ala294Thr) identified in an Italian patient with similar pathologies. Functional and biochemical characterization indicates the mutant lacks transport activity likely due to misfolding and loss of cell surface expression. The route by which taurine supplementation corrects these disease states is still an open question. Ongoing taurine supplementation studies with the patient harboring this non-functional TauT mutant will indicate whether successful taurine treatment of the Gly399Val patients is occurring through TauT or another transporter, providing critical insight regarding how increased taurine intake elevates bioavailability in these patients.

191	Di Wu	Music	Interacting With a Living Composer: The Role of Experiential Learning Theory in Piano Learning (in progress)
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This poster presents a study exploring collegiate piano students' perception after interacting with a living composer to debut newly composed piano pieces. Using a case study design and Kolb's experiential learning theory, the study aims to understand students' experiences in developing a sense of ownership in musical interpretation and exploring diverse styles. Data collection involves five semi-structured Zoom interviews with each participant. The study will explore how students felt about their experiences, reflect on learning impact, and evaluate composer interaction's impact on their musical interpretation across styles. Implications include enhancing higher education music programs through efficient instruction and studio collaboration, emphasizing musical expression depth and process-oriented learning. Preliminary findings suggest collaborating with living composers enhances students' insight into the creative process and boosts their interpretation skills and confidence.

192	Maleeha Altaf	Electrical Engineering	Highly Deterministic Communication in a Space Environment
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This project aims to develop a space-based wireless communication system that can effectively accommodate applications of differing levels of determinism. For our purposes, high determinism is represented by low latency and low jitter. To accomplish this goal, a novel protocol stack is developed through modifications of the Medium Access Control layer of the OSI protocol stack to incorporate Virtual Circuits, Priority Queues, and a Dynamic Time-Division-Multiple-Access approach. These features allow management of different traffic classes where increased determinism is supported by higher priority. The physical layer is also adjusted with the adoption of 60 GHz spectrum to achieve high bitrate approaching 10 Gbps. The very small antenna element size associated with this spectrum allows the creation of arrays with a large number of elements in a small footprint, to achieve very narrow antenna beamwidth. To validate the approach, a 10-element linear array is presented that successfully steers the beam.

193	Anna Nguyen	Counseling Psychology	Latinas in Engineering: Microaggressions, Support, Multiple Roles, Work Satisfaction, and Turnover Intentions
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Engineering fields are known to be white-male-dominated with women and people of color in these fields facing systemic and personal challenges. Using Social Cognitive Career Theory, this study examines the relations of gender and racial microaggressions; perceived supervisor, coworker, and family support; and multiple role self-efficacy and outcome expectations to work satisfaction and turnover intentions in a sample of U.S.-based Latina engineers. The current study included 163 Latina engineers (mean age = 29.62 years, SD = 2.059). Data was gathered with an online survey, including valid and reliable measures. Using hierarchical linear regression analyses, it was found that experiencing gender microaggressions in the workplace was positively related to turnover intentions, whereas experiencing racial workplace microaggressions was positively related to work satisfaction. Perceived supervisor support was positively related to work satisfaction. Finally, multiple role self-efficacy was positively related to work satisfaction and negatively related to turnover intentions.

Poster	Presenter	Program	Abstract Title
194	Hesham Mahmoud	Geological Engineering	Groundwater recharge to Cold Region Shallow Unconfined aquifer using Process-based Models

Snow processes, frozen soil infiltration and snowmelt exert strong control on groundwater recharge to cold region unconfined aquifer. Blowing snow transport and in-transit sublimation result in a highly variable spatial patterns of snow accumulation resulting in variable recharge. To date, these cold region processes have been barely incorporated while estimating groundwater recharge. This study estimated groundwater recharge to shallow and unconfined aquifer (Oakes Aquifer) using field observations and process-based models (Cold Region Hydrological Model, CRHM and HYDRUS 1D) for 2022-23 water year. The water from Oakes aquifer presently irrigates about 13612 acres and up to 800 acre-feet permitted for irrigation. CRHM were simultaneously tested against distributed snow water equivalent (SWE) and soil moisture observations while HYDRUS 1D was tested against multi-depth soil moisture observations. The findings indicate that the recharge for the year 2022 2023 is approximately 6.9 inches, with around 2 inches attributed to the snowmelt recharge.

195	Rabeya Khatun	Educational Foundations & Research	Elementary Teachers' Perception towards "Climate Change Education": Understanding from a Climate Vulnerable Community
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For sustainable development, climate change education (CCE) must be considered in a geographically vulnerable country – Bangladesh- to increase awareness. This study focused on teachers' knowledge of CCE and the association between teachers' demographic characteristics and perceptions. Following the survey design, with 160 randomly selected teachers, the study focused on perception general, perception pedagogy, and perception teaching and learning. Participants were mainly male (60%), age level 25-35 years (64%), and had a graduation degree (78%). Almost all teachers had a professional degree, and less than half had 6-10 years of working experience. This study explored the fact that all three constructs were significantly correlated. Using SEM, the hypothesis model was tested, and it found that both general knowledge (0.21) and pedagogical knowledge (0.56) about climate change positively predicted classroom teaching ($r^2=58$). The national curriculum should include basic awareness of climate change issues, and K-5 teachers should receive extensive CCE training.

196	Ali Mollick	Mechanical Engineering	Exploring Small-Scale Propeller Performance at Low Advance Ratios and Low Reynolds Numbers
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In the ever-expanding world of Unmanned Aerial Vehicles (UAVs) and Micro Air Vehicles (MAVs), the need for precise small-scale propeller performance data is critical. Small-diameter propellers (6 inches to 22 inches) operating at low Reynolds numbers (30,000 to 300,000) based on the propeller chord at the 75% propeller-blade station, present intricate aerodynamic challenges, and their behavior at low advance ratios remains underexplored. The research offers detailed insights on propeller behavior by concentrating on low advance ratios and Reynolds numbers, particularly in situations where conventional data is scarce. This work presents the development of an experimental setup at University of North Dakota (UND) to measure propeller performance in various condition. The test rig was validated by successfully comparing the experimental results with reference data found in existing literature. Furthermore, performance data for propellers that are sold commercially but were not described in the existing literature to date are also included.

197	Sike Olateru-Olagbegi	Instructional Design & Technology	Investigations of the Effects of Microlearning in the Workplace
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Introduction This study is to investigate the effects of Microlearning defined as "a form of e-learning delivered in small chunks, focused on delivering skill-based and just-in-time knowledge shorter than 10-15 minutes" as an instructional approach to enhance employees' training outcomes. **Methodology Framework** The study will use an experimental research method with a control group design. Using convenience sampling, participants will be recruited from Whytecleon Ltd, Nigeria, and randomly assigned to take training modules in either traditional or microlearning instructional format with a post-test. A survey will be used to obtain trainees' perceptions of the training, in addition to a Focus Group interview of the Microlearning group. **Hypothesized Results** It is hypothesized that trainees who take the Microlearning instructional format will report higher levels of retention rate, content engagement, and time-saving.

Poster	Presenter	Program	Abstract Title
198	Opeyemi Oni	Petroleum Engineering	Drilling Fluid Formulation for Geothermal System Using North Dakota Fly Ash Particulate as an Additive.

North Dakota faces an environmental challenge due to the abundance of fly ash waste from its power plants, prompting concerns over waste management. Fly ash, possessing pozzolanic properties, has potential as a supplementary cementing material to reduce permeability by blocking pore throats. It is crucial to design drilling fluid that must address various challenges like excessive filtrate loss, sag, and poor rheological properties hence withstanding severe harsh downhole conditions typically encountered in geothermal drilling. This study examines North Dakota fly ash as a water-based mud (WBM) additive to combat these issues. Four WBM formulations with varying fly ash concentrations were developed and evaluated using American Petroleum Institute standard procedures. Results demonstrate fly ash's efficacy in improving rheology, reducing filtrate loss, and mitigating solid sagging, outperforming perlite suggested by previous research. Fly ash as a WBM additive offers cost-saving benefits, repurposing waste material while enhancing drilling fluid performance in challenging conditions.

199	Brenda Barragan	Counseling Psychology	Mental Health Stigma Among Emerging Latiné Adolescents Help-Seeking Intentions
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Recent trends have shown an increase in severe mood disorders among emerging Latiné adolescents (12-17 years old; Twenge et al., 2019; Yard et al., 2021). The purpose of this quantitative study is to extend the work of DuPont-Reyes et al., (2020) and Villatoro et al., (2022) to explore how social identities (i.e., gender, immigrant status, and SES), have on mental health stigma (i.e., knowledge and attitudes, awareness and action, avoidance and discomfort, social distance, and self-stigma), personal help-seeking (i.e., intentions and behaviors), and help-seeking recommendations for peers across settings (i.e. formal treatment, informal support, and school-based services) among emerging Latiné adolescents when controlling for cultural variables (i.e., familismo and ethnic identity), previous exposure to mental health issues, and current mental health symptoms. This study will provide more information that will enhance the understanding of mental health stigma and help-seeking disparities in a sample of 300-350 emerging Latiné adolescents.

200	Victor Ojo	Mechanical Engineering	Low-Temperature Laboratory Instrumentation for Investigating Ice Crystal Aggregate Formation in the Atmosphere
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This study addresses the challenge of achieving controlled low temperatures (-40oC) to investigate and provide information on the precise conditions that promote atmospheric ice crystal formation and aggregation, which disrupt aerospace industries and military activity. I present a novel temperature control design for generating levitated ice crystal aggregates within a Dual Balance Electrodynamic Trap (DBET). The design integrates chilled-coolant-conveying copper tubes encircling the hollow-square-shaped DBET's external wall to precisely control its inner chamber temperature while incorporating real-time temperature sensing, control, and data analysis as the levitated microdroplets are frozen and aggregated within the DBET. Currently capable of cooling the DBET's inner chamber to -9.0oC, this setup provides valuable data for aerospace engineers and atmospheric scientists designing hypersonic vehicles and developing precise cloud models which are poorly constrained in global atmospheric models. Future works aim to achieve lower temperatures, enhancing experimental insights into ice crystal structure and sticking potential.

201	Jasmine Skorheim	Forensic Psychology	Personal Knowledge of Sexual Violence Victims and Perpetrators in College Men
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Sexual violence perpetration and victimization are prevalent issues in college men. Prior research suggests that many of those who perpetrate sexual violence perceive their behavior as normal and/or justified; however, it is unclear how many individuals actually know someone else who has perpetrated it. A better understanding of these relationships could better inform prevention programming. The goal of the current study was to assess personal knowledge of sexual violence victims and perpetrators in men and their relationships to people with these experiences. 468 college men completed an online survey regarding their personal experiences of sexual violence as well as their personal knowledge of others who have experienced sexual violence. Overall, participants with personal experiences of sexual violence, whether victimization, perpetration, or both, were more likely to have personal knowledge of other victims (51.4%, 62.9%, and 61.2% respectively) and perpetrators (35.1%, 51.4%, 49.6% respectively) of sexual violence compared to nonviolence-exposed controls.

Poster	Presenter	Program	Abstract Title
202	Victor Moreno Lozano	Biomedical Engineering	Pressure relief effectiveness of standard, gel, and active support surfaces used in the operating room

This study aimed to compare the effectiveness of three different types of support surfaces (alternating pressure support surface, foam surface, and a gel overlay) in terms of pressure relief. The alternating pressure mattress is designed with a series of thin air cells that alternate in pressure to redistribute pressure away from the patient's body and increase blood perfusion to those areas. This is achieved by inflating some cells and deflating adjacent cells within the support surface every 5 minutes. To compare the support surfaces, we placed a thin pressure mapping sensor mat on the support surface, and we measured the pressure exerted by the patient's coccyx area at various points for a period of 5 minutes. This experiment was conducted with a sample size of 11 participants. The pressure map data was analyzed to identify the most effective support surface in reducing average pressure over the experiment time. ... (abstract truncated)

203	Joni Tweeten	Education, Health, & Behavior Studies	Using a Design-Based Research Approach to Implement and Evaluate Project-Based Learning in Population Health Nursing Education
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This study aimed to evaluate and improve the implementation of Project Based Learning (PjBL) in a population health nursing clinical class, where students worked in collaboration with their assigned clinical agency and instructor to complete a PjBL project. Three iterative research cycles were conducted with data collected at the end of each cycle through surveys and focus group interviews of students, interviews of faculty and clinical agency contacts, and assessment of student work and performance. Data were analyzed and revisions and improvements were planned for subsequent cycles and future use in the course. The three-cycle design allowed for revisions to be evaluated, further improved, and integration into the course. Overall, the iterative process of the design-based research method proved effective for evaluating and improving the implementation of this PjBL course design by developing faculty facilitation skills and optimizing the use of PjBL for effective learning and development of clinical judgement.

204	Ibukun Ojo	Petroleum Engineering	A New Model for Predicting Pressure Profile in Two-Phase Geothermal Wells
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The complexity associated with the modelling in two phase or multiphase flow system in geothermal wells have been a long-time challenge especially due to the fact that the temperature in geothermal systems cannot be assumed constant unlike the oil and gas wells. The performance of geothermal wells is dependent on the accurate prediction of the pressure profile in the well from the subsurface to the surface, thus, many researchers have developed correlations to predict flowing wellbore pressure in geothermal wells. However, many of the results obtained are not consistent with field measurements. It has been conceived in the study that the discrepancy may be due to the unrealistic assumptions in the fundamental thermodynamic energy equation used for the derivation of their models. Starting from the momentum equation a more exact numerical model for evaluating the flowing pressure in geothermal has been derived in the study where the right constituent terms that practically affect two-phase flow behaviour in a geothermal wells are considered. ... (abstract truncated)

205	Matt Torgerson	Teaching & Leadership	Exploring Strategies for Enhancing Student Attendance: A Rural Minnesota School Case Study
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This research utilizes the Dana & Yendol-Hoppey (2020) inquiry model to identify effective strategies that educational leaders can utilize for improving K-12 students' consistent attendance at school. The study integrates literature review along with informal interviews with faculty, staff, students, and county entities at a small, rural school in Minnesota. While the study is still ongoing, preliminary analysis suggests an inconsistent system of support for students. This research aims to generate recommendations for new policies and practices, contributing to a better overall system of student support.

Poster	Presenter	Program	Abstract Title
206	Md Ehsanul Haque	Clinical Translational Science	Chronic As+3 exposure induces an EMT-like state and represses progenitor markers in human renal progenitor cells

Heavy metal pollution in earth's crusts and groundwater has become a serious health concern worldwide. An example is arsenic, one of the most abundant and toxic metalloid contaminants found in water and soil; epidemiological studies have shown that it is carcinogenic to the skin, lungs, bladder, liver, and kidneys. Research has shown that arsenic metabolism takes place primarily in the liver, but other recent studies have noted that arsenic is also metabolized and eliminated in the human kidney's proximal tubules (PT). These tubules serve as the locations for the energy-intensive reabsorption of nutrients, sodium chloride, sodium bicarbonate, and water (60–70%). Thus, the proximal tubule of the human kidney can sustain a number of injuries during the reabsorption and metabolism of xenobiotics from drugs and environmental toxins, including heavy metals. Tubulointerstitial fibrosis and glomerulosclerosis are two common manifestations of renal fibrosis, which is caused by a deregulation of wound healing and excessive accumulation of extracellular matrix (ECM) proteins. ... (abstract truncated)

207	Collins Obeng	Biomedical Engineering	Handwashing and Showering Recognition Utilizing Wearable Humidity Sensor
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With the rising age of the population in the United States, there is a great demand for elderly care at long-term care facilities (LTCF). To address this shortage in care, CarePredict has introduced sensor-laden wearables that utilize machine learning to analyze residents' behavior and activity within LTCFs. The wearable detects changes in activity and behavior to predict the risk of a fall, depression, or urinary tract infection (UTI), allowing caregivers to give proactive interventions and improve patient health. This study aims to improve the augmented activity monitoring of users more precisely classifying activities in the bathroom. We demonstrate a proof-of-concept study to differentiate showering versus hand washing behavior by utilizing humidity data from the CarePredict wearable tempo device with a machine learning and signal processing algorithm. The ability to precisely classify such events plays a key role in early detection of behavioral changes which enables predictive medicine, especially with regard to UTIs.

GRADUATE RESEARCH ACHIEVEMENT DAY

Feb. 28, 2024 | [via undgrad2024.virtualpostersession.org/](https://undgrad2024.virtualpostersession.org/)

Judging Session: 9:00 a.m. to 11:00 a.m.

Awards Ceremony: Begins 1:00 p.m. via Zoom



Poster	Presenter	Program	Abstract Title
V1	Vesna Radivojevic	Educational Practice & Leadership	Teacher Diversity in International Schools: How Truly International Are International Schools?

Teachers as individuals are at the very heart of educational system, school, and students' experiences. They face many challenges in recognizing and addressing biases, fostering inclusive classrooms, and integrating multicultural perspectives into their teaching practices. They have to navigate within the complex system of norms, policies, and cultural expectations. While international schools offer opportunities for cross-cultural learning and global perspectives, they often grapple with issues of cultural homogeneity among their teaching staff. To enhance the quality of international education, schools must prioritize the recruitment and retention of diverse teachers. There is a continual need for inclusive pedagogies, such as Asset-Based and Culturally Sustaining Pedagogy, and policies that prevent various forms of oppression. By prioritizing teacher diversity and implementing multicultural education practices, K-12 international schools can take significant strides towards promoting social justice and equity in education.

V2	Sara Vashaghian	Geology	Petro-physical Characterization of Lodgepole Formation as a Geothermal Reservoir
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Geothermal energy is a sustainable and reliable source of energy as an alternative to conventional energy sources. Well logging is an essential tool in geothermal energy exploration as it provides information on subsurface lithology, fluid content, temperature and other variables that are interpreted as reservoir parameters. Different logs combination and their interpretation provide a comprehensive understanding about geothermal system. The Lodgepole formation located on top of the Bakken is a geological unit with great potential for geothermal exploration and development. Previous studies on the formation had been for hydrocarbon production and its geothermal potential is yet to be fully explored. A detailed reservoir characterization of the Lodgepole formation is essential for identification of potential geothermal reservoirs. Our studies involve acquiring, processing, and interpreting open hole logs and core data to estimate subsurface properties such as porosity and permeability, identify flow zones, and create petro-physical models to characterize geothermal reservoirs. ... (abstract truncated)

V3	Heather Medicine Bear	Indigenous Health	Patient Navigation for Cardiometabolic Disease in Tribal Health Systems
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American Indian and Alaska Native (AI/AN) populations experience a disproportionate burden of Cardiometabolic disease (CMD) related health challenges. Individuals managing CMD undergo comprehensive care plans between various medical departments involving a combination of behavioral interventions and clinical treatments. Through an Indigenous lens, focused on walking with a patient through their health journey, effective patient navigation programs can bridge gaps in healthcare access, provide support in navigating complex health systems, improve access to resources, and enhance adherence to treatment plans for AI/AN patients. For this study, a mixed methods survey was developed and disseminated within tribal health networks. The objectives included identifying existing patient navigation infrastructure, defining patient navigator roles and responsibilities, and identifying current policy successes and challenges. The findings from this study will help guide community-driven recommendations for policy formulation, with the goal of strengthening initiatives to improve the effectiveness of patient navigation for AI/ANs experiencing CMD issues.

V4	Dennis Terry Trevino	Space Studies	Satellite-Based Spectroscopic Identification of Nanoplastics in Phytoplankton
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Nanoplastics pose a significant ecological risk, particularly to marine phytoplankton—the base of the aquatic food chain. This study harnesses advanced hyperspectral imaging sensors on Planet Labs' satellites to monitor and quantify nanoplastic contamination in phytoplankton from low Earth orbit. The sensors' high resolution and extensive spectral range, paired with water samples from across the planet and using Thermo Fisher Scientific/Invitrogen Red Dye, distinguish unique spectral fingerprints of plastics. Preliminary findings reveal a widespread presence of nanoplastics, underscoring the inadequacy of current water filtration systems and highlighting potential risks to higher trophic levels and human health. This research, leveraging NASA Jet Propulsion Laboratory's sensor technology, provides critical insights into the pervasiveness of nanoplastic pollution and its possible ecological disruptions.

Poster	Presenter	Program	Abstract Title
V5	Anshu Arora	Communication	Effective Risk Management: Key to Navigating the Labyrinth that is the BC Construction Industry

Kasapoğlu (2018) noted that risks in construction are unplanned events, with impacts that affect performance and profitability. These impacts are usually negative, though they could be positive in certain situations, and the management of these events and subsequent impacts, is often referred to as risk management. Befrouei (2015) noted that risk management consists of frameworks and processes to manage these negative events in a way that minimizes and/or reduces the impact on organizations, projects, and activities. Mohammed & Knapkova (2016) noted that risk management should “respond to market factors which are out of management control in order to control volatilities.” (p. 1), and that effective risk management will help with managing risks that are both within management’s control and outside management’s control.

V6	James Folk	Computer Science	Enhancing AI Regulation
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The necessity of efficient regulation in the field of artificial intelligence (AI) is examined in this study. Rapid advancements in AI technology necessitate the establishment of strong legal frameworks to reduce risks and guarantee their ethical application. Examining the current status of artificial intelligence regulation, we look at successes in promoting responsible AI development and application. Even with the significant advancements, gaps still exist. This paper offers an integrative strategy to improve AI regulation through the use of cutting-edge technology like explainable AI, international collaboration, and the inclusion of multi-stakeholder viewpoints. This research attempts to add to the current conversation on AI regulation by combining findings from various sources and providing practical suggestions for researchers, business executives, and legislators.

V7	Greg Mullen	Educational Practice & Leadership	A New Bioecological Model of Human Development
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A new framework may help faculty to reflect on effective teaching and learning practices. The present framework is a custom lens designed to explore a teacher’s learning environment in support of a “self-directed” mindset within a traditional school setting. This framework includes elements organized into five overlapping layers: culture, values, competencies, characteristics, and personality (meta)traits. These layers are intended to highlight the specific traits and characteristics in a school’s leadership, teaching staff, and students in a way that supports the development of social and emotional competencies within defined elements of culture and shared values. This allows school leadership teams and teaching staff to reflect on how elements of culture and shared values may require socioemotional competencies that can often look different depending on the characteristics and traits of the school’s leadership, staff, and students.

V8	Muhammad Azam	Electrical Engineering	Advanced Motor Control using Machine Learning
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This work explores the viability of reinforced machine learning (RML) based motor control systems in industrial settings. Focusing on the limitations of traditional rule-based approaches in handling complex and nonlinear relationships in electric motor control, the study delves into RML’s potential to optimize real-time performance, adapt to dynamic conditions, and reduce energy consumption. The existing literature on RML-based motor control systems scrutinizes various approaches and applications across industrial domains. The research involves reviewing an RML-based motor control system, assessing its real-time optimization capabilities, and comparing its performance against traditional methods in a simulation environment. The work also identifies challenges in implementing machine learning in industrial contexts and proposes potential solutions. Anticipated outcomes include a deeper understanding of the advantages of ML-based motor control systems, modifications to enhance RML-based systems and an evaluation of their effectiveness in practical scenarios.

V9	Kaushiki (Kelly) Kapoor	Nursing Practice	Adverse Childhood Experienced Screening of adults by nurse practitioners
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Childhood events may affect a patient’s adult health status. According to the Centers for Disease Control and Prevention (CDC, 2021), adverse childhood experiences (ACEs) are potentially traumatic events that occur in childhood at any time from birth to 17 years of age. The list of potential traumatic events that can encompass ACEs is extensive. Examples of ACEs can be experiencing violence, abuse, or neglect; witnessing violence in the home or community; having a family member attempt or die by suicide; living in a home environment that can undermine a child’s sense of stability; growing up in a household with substance use problems; or facing economic hardships, parental separation, or household members being in jail or prison (CDC, 2021). ACEs have long term mental, physical and cognitive impact on adult patients’ healthcare. All patients should be screened for ACEs. This poster presentation will highlight the impact of an ACEs educational tool kit with online survey on licensed nurse practitioners. An attempt will be made to make a difference in nurse practitioners’ knowledge, awareness and attitude related to childhood trauma screening among their adult patients

Poster	Presenter	Program	Abstract Title
V10	Beth Klingele	Space Studies	Circadian Rhythms and Time Management: Building a Better Clock for Deep Space Missions

Modern space agencies utilize an Earth-centric 24-hour time system which supports human biology and social norms that have evolved over 2 million years to synchronize with the Sun, our most powerful zeitgeber. However, this time system is arbitrary for deep-space exploration where rotation periods will be different on other celestial bodies or absent all together. In this study, an extensive literature review was conducted to determine the most natural human circadian rhythm for use in development of an optimized clock which could be used to minimize performance and health issues caused by circadian rhythm disruption. Research revealed that humans will adopt an ~24.83-hour “free-running” endogenous cycle in the absence of time cues without ill effects. This was used to design a new space “day” period and became the basis of a new space time system built on the mercury ion-199 frequency standard utilized in NASA’s Deep Space Atomic Clock.

V11	Kelsey Odegard	Public Health	Evaluation of Free School Meals in Southern Minnesota
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This purpose of this research is to design an evaluation plan for the Free School Meals Program by identifying evaluation criteria and methods for determining the need, success, and sustainability of the program after 2025. In March of 2023, the Free School Meals Bill was passed in Minnesota. Starting in the 2023-2024 academic year, children in high school and below in Minnesota now have access to free or reduced-price school meals with no income or categorical requirements to qualify. The program is intended to reduce hunger for children in Minnesota and reduce stress and financial strain for families. This policy reimburses schools for free and reduced-price meals served to students after all federal reimbursement has been applied. Funding has been appropriated for the Free School Meals Program in Minnesota through Fiscal Year 2025.

V12	Morgan Craver	Space Studies	Likelihood of the Destiny Universe: An Analysis Using Contemporary Astrophysics and Planetary Science
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Since its release in September 2014, the universe of the Destiny video game franchise has captivated the minds of players across the globe. Its design, set in a futuristic fiction of the Solar System, takes human scientific achievement to the extreme, with some assistance from a paracausal entity called “The Traveler”. However, one must ask the question: is this possible? The presence of anti-gravitational person vehicles and mind-blowing terraforming is ever-so-fun to virtually explore, but does modern science support these feats of engineering, physics, and planetary science? The following will explore the Destiny universe’s non-Earthen celestial bodies, their characteristics in reality and in-game, and how they may be able to exist with current or proposed terraforming techniques. Out of the eleven worlds researched, the following are the most favored for real-life development: Earth’s Moon, Venus, Mars, Europa, and Titan.

V13	Kennedy Tooke	Occupational Therapy	Real Individuals Striving for Excellence (RISE): An occupation-based life skills re-entry program for rural jail facility
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The U.S. criminal justice system detains over 2 million individuals, with jail incarceration rates fluctuating (Zeng, 2022). Recidivism remains a significant issue, prompting the development of the Real Individuals Striving for Excellence (RISE) program to be completed within a correctional facility. RISE employs occupational-based learning sessions to equip participants with essential skills for successful community reintegration. Guided by the Model of Human Occupation [MOHO] (O’Brien, 2017), the program addresses facility and individual needs through a comprehensive needs assessment. Although the role of occupational therapy (OT) in criminal justice is emerging, research suggests its benefits due to the unique scope of practice. RISE, created in collaboration with Natrona County Department of Corrections, aims to reduce re-arrest and recidivism rates by fostering holistic, client-centered occupational programs. By utilizing OT principles, the program encourages positive lifestyle changes, enhances well-being, and raises awareness of community resources for those involved in the criminal justice system.

V14	Jacob Yates	Aerospace Sciences	Characterizing the risk of meteoroid ejecta for future lunar surface operations
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The lunar surface poses a potential risk from meteoroid ejecta for future lunar surface operations. The safety ramifications of long-term crewed missions for the Artemis program, NASA’s lunar program, are being investigated or reconsidered from the previous Apollo program. Recent studies (Robinson et al., 2015) observed ejecta debris from meteoroid impacts, traversing over greater distances than originally postulated in this current geological epoch. Two end-member ejecta types that are the most hazardous are: (1) iron lithic fragments, and (2) impact feldspar spheres. A series of hypervelocity impact tests using a two-stage light gas gun (2SLGG) were conducted against a set of proposed materials that are likely to be used for lunar surface operations. A terrestrial simulant for lunar regolith, LHS-1, resulted in the best type of shielding for low-depth penetration. This implies that using in-situ lunar regolith would be optimal shielding for fixed structures on the lunar surface.

Poster	Presenter	Program	Abstract Title
V15	Andria Kaplan	Nursing	Apple Cider Vinegar and Improved Urogenital Health

Decreased circulating estrogen following menopause results in friability of vaginal tissues creating an environment ripe for acquisition of recurrent urinary tract infections (rUTIs). Escherichia Coli (E. coli) is the primary causative organism in 80% of all cases (Lupo et al., 2021). The prevalence of bacterial colonization creates the basis for current prescribing practices that promote antibiotic resistance, altered urogenital health, and carry a substantial social and economic burden. This literature review seeks to understand the effectiveness of current treatment guidelines and prophylactic practices. While research on rUTI is wide-ranging, few have investigated the prophylactic benefits of Apple Cider Vinegar (ACV). In vitro studies using ACV demonstrate inhibition of resistant E. coli strains comparable to several prophylactic methods presently employed (Yagnik et al., 2023). The results of this review support the use of ACV as a daily method of UTI prophylaxis and provide a cost-effective, alternative for post-menopausal women.

V16	Rachel Jones	Aerospace Sciences	Underwater High-Frequency (HF) Amateur Radio Operations for Future Outer Space Applications
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Designed a hardwired, cable-based communication system to operate in an underwater habitat. High-frequency (HF) amateur radio is an invaluable medium for communication. Unfortunately, HF cannot penetrate through the water. This experiment had the University of North Dakota's (UND) Adventure, Exploration, Research, and Outreach (AERO) team design a radio communication setup that could operate while underwater. This experiment provides a foundation for future robotic space exploration of liquid-based environments. On January 5-6, 2024, three AERO divers spent 24 hours underwater at Jules Undersea Lodge in Key Largo, Florida. A typical radio layout features an antenna, a connection cable, and a transceiver radio. This experiment used two separate antennas: a land-based Chameleon Antenna and an experimental floating antenna built using an MFJ Ham Stick. DXE-400 Max coaxial cable was then run from the active antenna 25-feet down and into the underwater habitat. Successful HF operation was achieved using the land-based antenna.

V17	Brenda Epling	Teaching & Leadership	Evidence of Preparedness of Teacher Preparation Program Completers
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Teacher preparation programs play a crucial role in shaping education and the level of student achievement. Darling-Hammond (2000) states, "substantial research evidence suggests that well-prepared, capable teachers have the largest impact on student learning." Effectiveness of teacher preparation programs is key in producing high-quality teachers. This study focuses on teacher preparation program completers at a rural, public university in West Virginia. The study will answer the following: 1) After a year of teaching, to what extent do teacher preparation program completers feel prepared to teach and positively impact student learning in P-12? and 2) After a year of teaching, to what extent did supervisor evaluations of teacher preparation program completers indicate strengths or weakness in their teacher preparation program in areas of impact on student learning and application of professional knowledge, skills, and dispositions that preparation experiences were to achieve? Multiple measures including qualitative and quantitative data will be employed.

V18	Cortney Shuley	Educational Practice & Leadership	The Impact of Culturally Relevant Engineering Design on Student Outcomes and Engagement
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Embedding a culturally relevant approach into classroom instruction and pedagogy allows Native American middle school students to experience learning that is purposeful and meaningful while simultaneously giving them voice, thus impacting engagement along with outcomes. Within science classrooms, learning is enhanced for all students when Indigenous and Western science are integrated and when learning is connected to place, community, and the local cultural context. When teachers plan an engineering design task, while it has benefits in that it is fun, exciting, hands-on, and allows for interdisciplinary opportunities, is it culturally relevant? The purpose of this qualitative study is to explore the impact of integrating a Culturally Relevant Engineering Design (CRED) framework on students' experiences with engineering. Findings from this study, gleaned through student interviews and surveys, focus on the student influence when these practices are implemented. Implications may suggest teaching practices that support students across a breadth of cultural communities and groups, with a special focus on Native American tribes (2021).

Poster	Presenter	Program	Abstract Title
V19	Victor Tsui	Biomedical Engineering	Conducting an International Engineering Project under the Innovation-Based Learning Model

This article describes how the Biomedical Engineering Department has implemented the Innovation-Based Learning (IBL) model. IBL provides students with meaningful and applicable and equips students with the skills and mindset essential for success in dynamic and rapidly evolving environments. IBL teaching emphasizes a hands-on, project-based learning model. Students will engage in collaborative and synchronous teamwork on an engineering project. Project team members can be students from different BME courses, undergraduate or graduate, and in-person or online (remote) from other cities. However, the IBL international collaboration faces language barriers, local resource management, device setup, hardware and software integration, calibration variance across multiple test setups, and higher reliance on individual skill sets. This article documents the challenges faced using IBL methods, cooperating across multiple continents to design and build a Med-IoT biomedical device. The authors will explain how to conduct a design-build-test research project for Med-IoT and how they overcame the challenges.

V20	Stacy Johnston	Nursing Practice	Benefits of Addressing Immunizations by Health Care Providers
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The research presented will demonstrate the impact of addressing routine immunizations with clients who suffer from Severe Mental Illness and/or Substance Use Disorder, while visiting an outpatient mental health clinic. I will discuss different health care disparities affecting immunization rates, as well as demonstrate the benefits of healthcare providers addressing immunizations with clients during their appointments.

V21	Stacie Shropshire	Public Health	Association between religious service attendance and perinatal outcomes in the United States: a secondary analysis of the Future Families & Child Wellbeing Study
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Background. Increasing evidence suggests that religious involvement may be associated with improved health outcomes. However, few studies have examined maternal religiosity as a protective factor for perinatal outcomes. We explored the association between frequency of maternal religious attendance and risk of various perinatal outcomes. **Methods.** Data were drawn from the Future Families & Child Wellbeing Study's first and second waves (n=2320). Religious attendance and outcomes of prenatal care, low birthweight, breastfeeding, postpartum depression, and pregnancy loss were drawn from survey responses. Logistic regression estimated odds ratios and 95% confidence intervals. Models were adjusted for sampling weights and confounding variables. **Results.** Compared to those who reported no religious attendance, women who attended services once a week or more (OR:3.89;95%CI:1.07,14.10) or several times a month (OR:6.98;95%CI:1.15,42.37) had higher odds of not experiencing pregnancy loss. **Discussion.** Results suggest that maternal religious attendance frequency may be a protective factor for pregnancy loss.

V22	Allison Hinton	Earth System Science & Policy	Branching out: An isochrone map of Quercus alba migration
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A changing climate requires knowledge of species expected and potential migratory patterns in order to determine best practice for preparing and assisting survival of species. Plant species and other sessile species are especially slow to migrate due to migration only occurring across generations, especially the oak tree family. Quercus alba (white oak) migratory patterns were predicted for one tree in a western suburb of Chicago. The results show a need for assisted migration of the species due to extremely slow migratory patterns as witnessed in the created isochrone map.

V23	Anna Wiemken	Nursing	An examination of the relationship between vaccinations and autoimmune disease
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Vaccines have changed the health of the world by preventing massive casualties due to devastating infectious diseases. However, vaccines are in fact drug-like compounds with inevitable adverse events. There are compounds added to vaccines that have both intentional and unintentional side effects. While the primary objective of a vaccine is to stimulate an immune response through the production of antibodies, the development of an autoimmune disease is unsurprising. This project aims to address the following question. In patients who have received immunizations recommended by the Center for Disease Control (CDC), is there evidence that suggests vaccinations, as compared to individuals who are not vaccinated, result in dysfunction of the immune system? The medical literature will be summarized to create an educational resource for primary care providers who have patients with questions regarding vaccine safety.

Poster	Presenter	Program	Abstract Title
V24	Heather McNevin	Aerospace Sciences	What a Study on Near Midair Collision Events Has Shown Us About Safety

The effective management of aviation safety relies on the collection and analysis of data from safety management system (SMS) components, including voluntary safety reporting. The purpose of this research was to utilize a survey to gather insights from a diverse sample of pilots across the United States. The survey garnered significant participation (n=529), showcasing a notable gender balance among respondents. The findings revealed a concerning trend, with a substantial proportion of pilots (67%) failing to report high-risk safety events through any SMS channel. Interestingly, the data indicated that female pilots were more inclined to utilize SMS compared to their male counterparts. While this research indicates that the Aviation Safety Reporting System is trusted by pilots, these insights underscore the need for targeted interventions to enhance awareness and understanding among pilots regarding the importance and mechanisms of safety reporting, promoting a proactive safety culture, thereby enhancing aviation safety.

V25	Nicole lee Ellison	Indigenous Health	Piko to Piko - Growing Kalo on the Continent
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Cultivation of kalo (taro) is essential to Native Hawaiian identity. As an increasing number of Native Hawaiians live on the continent, we developed a community-academic hui (partnership) that aims to understand the health benefits of growing, preparing and consuming kalo on the continent and how growing kalo on the continent can nourish Native Hawaiians living in diaspora. After gaining permission from the Indigenous community in Oregon, our hui supported two māla kalo (cultivated fields for kalo) growing over 600 pounds of leaves with 200 volunteers since 2021. Preliminary findings indicate the māla kalo offers a space to promote mental and physical health through talk story, connecting with the land, sharing cultural knowledge and language, and feeding the community with traditional foods. Building on this work, we aim to use community-led research and culturally appropriate evaluation practices to understand and disseminate the health benefits of growing kalo on the continent.

V26	Jadalyn Wagner	Occupational Therapy	Occupational Therapy in Adolescent Mental Health: The Need and Value of Services
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Across the United States, there is a reported increase in children and adolescents facing mental health challenges, with more than half not being able to receive services. Long-term impacts of untreated mental illness include higher unemployment trends, not completing higher education, being more likely to isolate socially, and having unmanaged symptoms impacting the ability to participate in meaningful activities. As mental health agencies evaluate gaps in services, solutions may be addressed by occupational therapy. The purpose of this project was to highlight ways occupational therapy can fill the gaps through (a) evaluating the individual and their interactions within their environment, (b) assisting in community mental health programming, (c) utilizing the adolescent's meaningful occupations for developing the necessary skills, routines, motivation, and confidence to support mental health and wellbeing.

V27	Colin Wong	Teaching & Leadership	The Neglected Mental Health Challenges of First Generation College Students
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First generation college students (FGCS) face obstacles in academia that are unique to their lived experiences that lead to struggles with mental health and seeking support. FGCS are those who are the first in their families to pursue higher education. Research demonstrates that the struggles faced by FFGCS are complex including dealing with potential racial identity challenges, a lower socioeconomic status, isolation, and survivor's guilt. These factors lead to decrease mental health that often goes unmanaged by FGCS's. This research is a literature review analyzing the existing research on mental health regarding FGCS and the lack of support provided to this population. It highlights the gap in this research area and underscores the need for programs that uniquely support the mental health needs of FGCS to increase academic and transitional outcomes.

Poster	Presenter	Program	Abstract Title
V28	Maire Brandenburg	Educational Foundations & Research	Transition Programming for Students Classified with Emotional Disturbances in Mid-Western Rural America

North Dakota state data indicates a need to investigate the graduation rates and transition planning for students classified with emotional disturbances. Since 2020, the graduation rates of students classified with an emotional disturbance has declined significantly. There is a similar downward trend regarding appropriate secondary transition service planning for students (aged 16 and above) receiving special education services. This presentation includes a dissertation topic proposal designed around the following research questions:

- 1) How do primary special education and secondary special education teachers perceive the delivery of transition planning services as it relates to the planning processes, instructional practices, and collaboration?
- 2) How do special education teachers who specialize in ED perceive the delivery of transition planning services as it relates to the planning processes, instructional practices, and collaboration verses special education teachers who do not specialize in ED?

V29	Sean McCloat	Aerospace Sciences	Modeling the Architecture and Water Content of Exoplanet Systems by Pebble Accretion: The PPOLs Model
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A key area linking frontier observational capabilities to theoretical questions of exoplanet system architectures is the transport and evolution of water in planet-forming disks and mechanisms that tune its incorporation into planets. This research develops a pebble accretion model of planet formation (“the PPOLs Model”) that self-consistently handles the drift and accretion of rocky/icy pebbles around stars ranging from late M-dwarfs to early A-stars. The model grows multiple protoplanet cores simultaneously and evolves the snowline position consistently with evolving disk conditions. The combination of growing multiple cores while evolving the snowline allows for a prolonged period of growth and delivery of icy pebbles to the inner disk. Results explore water content in the habitable zone across the stellar mass range, and under which conditions systems resemble the Solar System or Kepler systems, ultimately connecting the formation conditions of stellar/disk properties and seed mass distribution to system architectures

