



Idaho State
University

Research & Creative Works

S Y M P O S I U M



March 13, 2024

EVENT PROGRAM

ROAR

Idaho State University's Land Acknowledgment Statement

Acknowledging Native lands is an important way to honor and respect Indigenous peoples and their traditional territories. The land on which Idaho State University's Pocatello campus sits is within the original Fort Hall Reservation boundaries and is the traditional and ancestral home of the Shoshone and Bannock peoples. We acknowledge the Fort Hall Shoshone and Bannock peoples, their elders past and present, their future generations, and all Indigenous peoples, including those upon whose land the University is located. We offer gratitude for the land itself and the original caretakers of it.

As a public research university, it is our ongoing commitment and responsibility to teach accurate histories of the regional Indigenous people and of our institutional relationship with them. It is our commitment to the Shoshone-Bannock Tribes and to ISU's citizens that we will collaborate on future educational discourse and activities in our communities.

Table of Contents

Letter from the Vice President of Research and Economic Development	2
Letter from the Interim Dean of the Graduate School	3
Keynote Speaker	4
Pocatello Campus Agenda	5
Meridian Campus Agenda	5
Oral Presentations	6
Graduate Oral Presentations	6
Undergraduate, Doctor of Pharmacy and Health Resident Oral Presentations	9
Creative Works Presentations	11
Poster Session Presentations	11
Graduate Poster Session	11
Undergraduate, Doctor of Pharmacy and Health Resident Poster Session	16
2023 GRS Award Recipients	20
Oral Presentation Award Recipients	20
Poster Presentation Award Recipients	21
Creative Works Award Recipients	21
List of Student Participants	22
College of Arts and Letters	22
College of Science and Engineering	22
College of Business	24
College of Education	24
Kasiska Division of Health Sciences	25
College of Pharmacy	25
College of Health	25
School of Nursing	26
Abstracts	28
Graduate Abstracts	28
Doctor of Pharmacy and Health Resident Abstracts	71
Undergraduate Abstracts	75
Fall 2023 3-Minute Thesis Winners	95

Letter from the Vice President of Research and Economic Development



Martin Blair

Vice President of Research
and Economic Development

ISU Student Research Colleagues,

You have accomplished much, learned much, and now contribute much to our common understanding of the world around us. Engaging in thoughtful discovery and imaginative creative works changes us in meaningful ways. The mental work you have done invites us to think more critically about how and why things function the way they do. It may even change our minds or encourage us to feel something we haven't experienced before. Thank you for sharing the results of your work--for putting yourselves "out there." I understand where you are coming from. Not too many years ago I was an undergraduate researcher sharing what I was learning. What you share today may be the beginning of an intellectual journey that will keep you exploring for decades to come. So, keep learning, keep growing, keep innovating, and keep sharing!

Letter from the Interim Dean of the Graduate School



Tracy Collum

Interim Dean of the Graduate School

It's an exciting time at Idaho State University. We have officially entered our 10th anniversary of a Graduate Research Symposium. That's 10 years of celebrating graduate student research, scholarly endeavors, creative thinking, excitement, and energy in their fields! We mark this tremendous milestone by incorporating the entire university student body into one significant research event.

This year, the ideology of interdisciplinary and collaborative work comes to life as we celebrate over 140 students in over 55 fields sharing their work with us. As audience members, relish in the opportunity these students have been provided, cheer on the work they are presenting, and encourage them to continue. Our university-wide Research & Creative Works Symposium has coincided with Bengal Giving Day. This is the perfect opportunity to celebrate our students by contributing in areas that will assist them further in their scholarly endeavors. However you choose to support our Bengals, we know you will do it with pride.

Keynote Speaker



H. Cathleen Tarp, Ph.D.

Professor

Department of Global Studies and Languages

Dr. Tarp's academic journey is marked by a rich tapestry of qualifications and certifications. She holds a Ph.D. in Romance Languages from the University of New Mexico, complemented by a Master's degree in Hispanic Studies and a Bachelor's degree in English from the same institution and the University of Idaho, respectively. Her thirst for knowledge extends beyond traditional academia, evidenced by certifications such as Mental Health First Aid Certification (2021) and CHW (Community Health Worker) Certification (2020), showcasing her dedication to holistic community well-being. Dr. Tarp was also instrumental in developing the highly sought-after graduate level certificate - Spanish for the Health Profession.

Dr. Tarp's areas of specialization are the Spanish Middle Ages and Baroque. Current research interests include the grotesque, Spanish prose romance, and narratology in the context of the development of prose fiction. Dr. Tarp is a certified medical interpreter and a qualified legal interpreter. She is also a faculty advisor for Sigma Delta Pi, the National Spanish Honor Society, and the ISU student organization, Entrepreneurs of America.

Pocatello Campus Agenda

Wednesday, March 13, 2024

Pond Student Union Building

1:00 - 3:00 p.m.	Graduate Oral Presentations	SUB - Upstairs Room & Little Wood
1:00 - 2:45 p.m.	Undergraduate, Doctor of Pharmacy and Health Resident Poster Session	SUB - Ballroom
3:00 - 5:00 p.m.	Graduate Poster Session	SUB - Ballroom
3:00 - 5:00 p.m.	Creative Works	SUB - Wood River
3:15 - 4:45 p.m.	Undergraduate, Doctor of Pharmacy and Health Resident Oral Presentations	SUB - Upstairs Room
5:00 - 5:30 p.m.	Celebrate Bengal Giving Day	SUB - Quad Lounge
5:30 - 6:15 p.m.	Keynote Speaker Dr. Cathleen Tarp, Professor <i>Department of Global Studies and Languages</i>	SUB - Ballroom
6:15 p.m.	Awards & Reception	SUB - Ballroom

Meridian Campus Agenda

Wednesday, March 13, 2024

Sam and Aline Skaggs Health Science Center

1:00 - 5:00 p.m.	Oral Presentations	Room 686/818
3:00 - 4:30 p.m.	Poster Presentations	Main Foyer
5:30 - 6:30 p.m.	Welcome, Keynote, & Awards via YouTube Live	Room 686

Oral Presentations

Graduate Oral Presentations

**Please note that only the Primary Presenter is listed. Full presenter names will be provided alongside their abstracts.*

Biological & Natural Sciences

Shirley Sargent Family Boardroom

Constructing the 3-Dimensional Structure of the Mechanoelectrical Transduction Channel

Christopher Nicolet

Synthesis of Vitamin C Analogs as Novel Hearing Loss Therapeutics

Jordan Oman

Future of Fin Filmography: A novel system to record and analyze fin movements

Makenzie Reed

Searching for Patterns that Lead to Invasive Success in Novel Environments: Genetic Variations Among *Chorispora tenella* Populations

Rachel Havok

Identifying the Second Metal Binding Site in *Streptococcus pneumoniae*

Phosphoglucomutase: A Study in Metal Stoichiometry

Sajal Acharya

Total synthesis of Spisulosine and its anti-cancer results from NCI-60 cell lines screening

Sameena Mateen

Ecophysiology of thermophilic endospores in deep sea hydrocarbon seep sediments

Soni Thapa

Business, Economics & Public Administration

Little Wood

The Effects of Ransomware in Southeastern Idaho

Matthew Elliott

Level of Triple Bottom Line Reporting Coverage: A Study on the Banking Industry of Bangladesh

Rian Binte Kamal

Education, Learning & Training

Little Wood

Psychiatric Technician Competency to Care for Mental Health Inpatients

Ashley Chermak

Financial Distress and Suicide Among Clinical and Counseling Graduate Students

Brittany Stalzer

Interactive Gameplay with Heart Rate as the Controller to control player anxiety

Md Mosharaf Hossan

Navigating Benefits and Concerns when Discussing GenAI with Educators and Staff

Reed Hepler

Integrating A Simulation Platform for ESL Teacher Candidates Training: A Case Study on Lesson Planning and Delivery

Tingxuan Lu

Engineering, Physical & Mathematical Sciences

North Fork

Data-Driven Model for Improving MEG Epileptic Spike Detection

Antora Dev

Use of AI in Software Engineering: An Exploratory Study

Arifa Islam Champa

Frozen fountains: Rock glaciers as cold-water reservoirs in semi-arid mountain ranges

Olivia Stanley

A Comparative Analysis of Automated SBOM Tools for Open-Source JavaScript Projects

Md Fazle Rabbi

A Smart Autonomous Ground Vehicle with the Ability to Adapt Its Size to Environments

Sara Sourani Yancheshmeh

Short Term Load Forecasting Based on Ensemble Model: GRU-LGBM Fusion

Shijon Das

Insights into the Use of ChatGPT in Programming

Costain Nachuma

Short-Term Load Forecasting Employing Recurrent Neural Networks

Tanzim Mostafa

Health, Nutrition & Clinical Sciences

Middle Fork

Health Outcomes of Children Taking Over-the-Counter or Prescription Reflux Medications

Alicia Martin-Cowger

Renin-Angiotensin System Components and Arachidonic Acid Metabolites as Biomarkers of COVID-19

Biwash Ghimire

Demographics Affecting Access to Hearing Technology: Insights from NHANES

Blair Richlin

Addressing Echolalia With WH-Questions - A Case Study

Bridget Fitzpatrick

Lights, Camera, Conversation! A Community Movie Day for Advance Care Planning Readiness

Emily Harames

Discovery of Positive Allosteric Modulators (PAMS) of $\alpha 9/\alpha 10$ nicotinic acetylcholine receptors for the treatment of hearing loss

Pooja Sapkota

The Effects of Spirituality and Religiosity on Body Image

Lexy Packer

Artificial Intelligence driven in-silico discovery of novel modulators of nicotinic acetylcholine systems

Nirajan Bhattarai

An Evidence-Based Continuing Education Course Reducing Nurse Emotional Burnout by Reframing Bias Training

Sadie Cole

Unveiling Neurotropic Mysteries: Decoding the Interaction Between HSV1 and Nicotinic Acetylcholine Receptors

Seyedeh Melika Akaberi

Humanities, Behavioral & Social Sciences

South Fork

Fake news! Or is it? Individual differences in fake news discrimination and knowing when you've been duped

Alicyn Ager

Can AI Provide Quality Translation for Psychotherapy Research Measures?

Angelina Conrow

Criticism of Francoism in "Las melancólicas" by Rafael Moreno Alba

Caleb Dorcheus

Suicidality and Perceived Program Support among Clinical and Counseling Psychology Doctoral Students

Eliana Claps

From Forgetting to the Construction of a Narrative

Erik González Campos

Client, Therapist, and Researcher Beliefs about What Makes Psychotherapy Work

Jacob Bingham

The Risk Reflection: How Fears of AI Translate into Ban Advocacy of Generative Artificial Intelligence

James "JD" Wardell

Best practices for trauma-focused research with women in corrections settings

Katie Stubbers

Operating Queer under the Cuban Regime

Matthew Kolbusz

Public Support for and Trust in ISideWith.com: Examining Perceptions of the Global Leader in Voter Education

Tanner Morton

Undergraduate, Doctor of Pharmacy and Health Resident Oral Presentations

**Please note that only the Primary Presenter is listed. Full presenter names will be provided alongside their abstracts.*

Education, Learning & Training

Little Wood

Reasoning Talks: Teachers' Perspectives on Implementing an Emerging Mathematical Pedagogy to Support All Learners

JadaLin Perkins

Health, Nutrition & Clinical Sciences

Little Wood

Assess and address Lifestyle Medicine awareness in marginalized populations

Zachary Nelson

Case Study: Myocardial Infarction caused by Paradoxical Coronary Artery Embolism in 19 year old, bringing attention to faults in the ER diagnostic system

Brooklynn Hammond

Patient's Attitudes Towards Artificial Intelligence in Healthcare Technology: A Scoping Review

Zachary Cochran

Humanities, Behavioral & Social Sciences

Little Wood

The Impact of Non-Pharmaceutical Pediatric Pain Management Interventions

April Thunell

Empowering Patients: The Role of Early Hospice Discussions in Quality of Life

Sydnee Thomas

Mentorship Matters: Wisdom and Insights from a Qualitative Analysis of the PsychSessions Podcast Mentoring Series

Ellie Cameron

Biological & Natural Sciences

Shirley Sargent Family Boardroom

Adapting to the Heights: Insights into Altitude Acclimation and Cardiac Function

Aubree Denker

Adhesive Performance of Polymerized Garlic Essential Oil and Plant Extracts

Veronica Miller

Improvements to Quantitative Lava Morphology Classifications

Kyleigh Kowalski

Dance, Music, and Healing: A Comparative Study in Pediatric Oncology

MaKenna Winnett

Nutrition and Its Role in Maintaining the Cardiovascular System.

James Heberlein

Engineering, Physical & Mathematical Sciences

Shirley Sargent Family Boardroom

Redux: An Interactive, Dynamic Knowledge Base for Teaching NP-completeness

Andrija Sevaljevic

Solar Panel Water Craft

McKenzie Gerdes

Creative Works Presentations

Wood River, 2nd Floor, PSUB

Structural vulnerabilities and Indigenized harm reduction strategies for missing and murdered Indigenous peoples, Idaho

Juliette Bedard

Women Who Are Asian Immigrants: The Seen and Unseen

Yidan Guo

Mapping Barriers to Entry of Spanish-Speaking Students in Forensic Anthropology: Diversity in Academic Opportunities at United States Hispanic-Serving Institutions

Patricia Morales Lorenzo

Poster Session Presentations

Graduate Poster Session

**Please note that only the Primary Presenter is listed. Full presenter names will be provided alongside their abstracts.*

Biological & Natural Sciences

#8 **Identification and Quantification of Sesquiterpene lactones (SLs) in Sagebrush (*Artemisia tridentata*) and its chemical modification**

Dishant Aggarwal

#23 **Mapping and Geochemical Insights into Magmatic Evolution in the eastern Snake River Plain, Idaho**

David Cavell

- #1 **Investigating the regulatory role of Hic1 and Hic2 in Wnt signaling pathway during neural crest development**
Fatemeh Falahati Marvast
- #36 **Searching for Patterns that Lead to Invasive Success in Novel Environments: Genetic Variations Among *Chorispora tenella* Populations**
Rachel Havok
- #17 **Investigating Masp1 Proteolytic Function During Early Development in *Xenopus laevis***
Mikayla Macaluso
- #35 **Synthesis of Vitamin C Analogs as Novel Hearing Loss Therapeutics**
Jordan Oman
- #41 **Dorsal fin raises as low intensity aggressive displays during hierarchy resolution in a sexually plastic fish**
Makenzie Reed
- #13 **Thiolate ligand effects on behavior of molecular precursors for earth abundant semiconducting nanomaterials**
Ainsley Snyder

Business, Economics & Public Administration

- #29 **Level of Triple Bottom Line Reporting Coverage: A Study on the Banking Industry of Bangladesh**
Rian Binte Kamal

Education, Learning & Training

- #32 **Psychiatric Technician Competency to Care for Mental Health Inpatients**
Ashley Chermak
- #14 **National Service Learning in Higher Education**
Farhana Hibbert
- #24 **Designing a Serious Game for CBT and The Influence of Personality Traits on Gameplay Experience**
Rifat Ara Tasnim
- #20 **A Mindful Pedagogical Approach to the Maternal in 20th-Century Postcolonial Fiction”**
Jessica Woolley

Engineering, Physical & Mathematical Sciences

- MC **A Novel Spectrum Injection Scheme for Enhanced Baseband Signal Reconstruction and Channel Bandwidth Optimization**
Ahmed Ashour
- #39 **Crafting the Shield: Curated Email Datasets for Phishing Detection Using Machine Learning**
Arifa Islam Champa
- #30 **Short Term Load Forecasting Based on Ensemble Model: GRU-LGBM Fusion**
Shijon Das
- #26 **Surface morphometry as a control on micro-Ice Stability Regions (ISR)**
Daliedmarie Delgado Maisonet
- #33 **Data-Driven Model for Improving MEG Epileptic Spike Detection**
Antora Dev
- #21 **Model-Based Reinforcement Learning with System Identification and Fuzzy Reward Applied to Advanced Manufacturing**
Nusrat Farheen
- #5 **Optimization of Submerged Oscillating Water Column (SWOC) Energy Harvester**
Icawal Ghimire
- #28 **Modeling and Implementation of a Flamelet Based Model With Presumed Shaped Probability Distribution Function Integration in Fortran for Laminar Non-premixed Flame Dynamics**
Md Azazul Haque
- #12 **Integrating Microbial Fuel Cell and Hydroponic Technologies Using a Ceramic Membrane Separator to Develop an Energy-Water-Food Supply System**
Monte Hibbert
- #7 **Precursor Detection of Spike Stall in Axial Compressor Systems using Machine Learning Fusion**
Golam Gause Jaman
- #2 **Serial Number Restoration**
Ivy Marshall

- #40 **Occluded Object Detection for Autonomous Vehicles Employing YOLOv5, YOLOX, and Faster R-CNN**
Tanzim Mostafa
- #43 **Insights into the Use of ChatGPT in Programming**
Costain Nachuma
- #9 **Potential of PCC-RCC Concrete Tetrapod in Mitigating Near-shore Ocean Acidification**
Yashodha Nyaupane
- #25 **Synthesis of Condensation Polymer Model Compounds for Degradation Studies**
Kendal Olson
- #15 **Degradation Study of Condensation Polymer Model Compounds by Gamma Radiation**
Carlyn Osterhout
- #42 **Insights into AI-Generated Python Code: Quality and Security Analysis**
Md Fazle Rabbi

Health, Nutrition & Clinical Sciences

- MC **Unveiling Neurotropic Mysteries: Decoding the Interaction Between HSV1 and Nicotinic Acetylcholine Receptors**
Seyedeh Melika Akaberi
- MC **Exploration of a Novel Risk Stratification Process to Identify Heart Failure Patients at Highest Risk for Readmission**
Amanda Bertram
- MC **Community-Based Nutrition Education and its Role in Child Nutrition**
Claire Christensen
- MC **Addressing Echolalia With Wh-Questions - A Case Study**
Bridget Fitzpatrick
- #34 **Lights, Camera, Conversation! A Community Movie Day for Advance Care Planning Readiness**
Emily Harames
- MC **New Molecular Entities Protect Hair Cells Against Aminoglycosides-Induced Ototoxicity**
Elizabeth Kara
- #18 **Neural representation of noisy and reverberant speech**
Macy Knudsen

- #10 **Effects of Physical Activity on the Mental Health of Older Adults**
Michelle Kruse
- #3 **The Relationship Between Diet Type and Nutrient Intake with Markers of Coronary Risk**
Jarrett Mitton
- MC **A High Throughput Method of Streptolysin O Antibody-Epitope Mapping by Random Mutagenesis**
Anyaubu Nmaju
- #31 **The Effects of Spirituality and Religiosity on Body Image**
Lexy Packer
- MC **Age and Hearing Effects on Cognition and Speech-in-Noise Recognition**
Tali Rotman
- #37 **Discovery of Positive Allosteric Modulators (PAMS) of $\alpha 9/\alpha 10$ nicotinic acetylcholine receptors for the treatment of hearing loss.**
Pooja Sapkota
- #27 **Self-Efficacy in College Students with Dyslexia: A Survey Study**
Emma Shiflet
- MC **Canine Audiology: What is Normal?**
Jennifer Tyler
- #6 **Investigation into a Strength & Conditioning Needs Analysis**
Sarah Wilensky

Humanities, Behavioral & Social Sciences

- #11 **Knowledge & Perceptions: A Path Towards Judicial Treatment Reform**
Joseph Chacon
- #38 **Criticism of Francoism in "Las melancólicas" by Rafael Moreno Alba**
Caleb Dorcheus
- #22 **Steps to Recovery: Does Treadmill Training Improve Locomotion in Spinal-Transected Rats?**
Leticia Herrera
- #16 **Effects of High-Sugar Diets on Delay Discounting for Food in Binge-Eating Prone and Binge-Eating Resistant Rats**
Morgan Musquez

- #4 **Navigating the Online and Offline Challenges of Community Journalists in the Digital Age**
Md Masud Un Nabi
- #19 **Muammar Gaddafi and the United States of Africa: The Unfulfilled Vision**
John Opeifa

Undergraduate, Doctor of Pharmacy and Health Resident Poster Session

**Please note that only the Primary Presenter is listed. Full presenter names will be provided alongside their abstracts.*

Biological & Natural Sciences

- #31 **Rowlf's Enzymatic Experiment: Unique Bean Enzyme Found in Novel Bacteriophage**
Aisley Allen
- #28 **Walk This Way: Weight-Bearing Locomotion Comparison After a Spinal Cord Injury in Neonatal Rats**
Lizbeth Arellano Santoyo
- #25 **Adapting to the Heights: Insights into Altitude Acclimation and Cardiac Function**
Aubree Denker
- #6 **Investigating Thermophilic Endospores in Monterey Canyon**
Bronwyn Ellis
- #30 **Exploring the Respiratory System**
Brooklynn Hammond
- #13 **Ammonia Volatilization in an Intermittent Stream Before and After Fire**
Rylee Mathison
- #1 **Hypermethylated in Cancer 2 (Hic2) manipulation affects Cranial Neural Crest gene expression in *Xenopus laevis***
Mya McHugh
- #4 **Adhesive Performance of Polymerized Garlic Essential Oil and Plant Extracts**
Veronica Miller
- #19 **Exploring Martian Volcanoes through Computer Image Analyses**
Kelsey Pella
- #8 **MASP1 interacts with the BMP signaling pathway during early xenopus development**
Aaliyah Tovar

- #12 **The transcription factor hypermethylated in cancer 2 (Hic2) influences the development of the hatching gland in *Xenopus leavis*.**
Miriam Villa Lopez
- #15 **Tissue Engineering: Exploring the Potential of 3D Bioprinting for Cardiac Regeneration**
Payton Walker
- #20 **Measuring Pulmonary Immune Response to Low-Dose, Short Fiber Asbestos**
Virginia Wallace
- #7 **Dance, Music, and Healing: A Comparative Study in Pediatric Oncology**
MaKenna Winnett

Business, Economics & Public Administration

- #32 **Understanding the Challenges and What Works in Return-to-Work**
Logan Jennings

Education, Learning & Training

- #3 **Importance of Shielding in Fluoroscopy Exams**
Samantha Howard

Engineering, Physical & Mathematical Sciences

- #11 **Zeolite Catalyzed Friedel-Crafts Acylations**
Angela Hayden
- #5 **Synthesis and Characterization of Cationic Polysulfides for Heavy Metal Binding.**
Daniel Herrera
- #18 **Hydrolysis of Esters Using Zeolites as Acid Catalysts**
Mason Sistrunk
- #23 **Plasma Methods for Novel Advanced Manufacturing Feedstock Development**
Adam Storms

Health, Nutrition & Clinical Sciences

- #10 **Effect of SID on EI Number**
Brittanie Cornelsen
- #16 **Addressing Barriers to Naloxone Prescribing: Investigating the Impact of Educational Interventions on Naloxone Prescribing in a Federally Qualified Healthcare Center**

Madeline Foster

- #17 **The Effects of Clothing Artifacts on Image Quality**
Emory Hebdon
- #22 **How Changes in OID and SID Factors Affect Quality Imaging**
Victoria Higley
- #2 **Safety and Efficacy of Implementing a Low-Dose Amoxicillin Challenge Protocol to Rule Out Inaccurately Reported Penicillin Allergies in the Inpatient Setting**
J. Andrew Hopkins
- #21 **Enhancing Inpatient Blood Glucose Control: A Collaborative Approach**
Harrison Hoskins
- #9 **Implementation of a hypertonic saline bolus and infusion protocol for the management of patients with or at risk for elevated intracranial pressure and cerebral edema in the adult intensive care unit at a trauma center**
Sofia Manczurowsky
- #24 **Assess and address Lifestyle Medicine awareness in marginalized populations**
Zachary Nelson
- MC **Sound Solutions: Improving Health Literacy in Deaf Communities**
Anna Przybylo
- #27 **Optimizing X-ray Grids for Knee Radiography**
Daisy Rosas
- MC **Mobile-Offsite-Special COVID-19 Vaccination Clinics for Communities Disproportionately Affected by COVID-19 - Focus on Community Partnerships**
Tanner Tracy
- #29 **The Effect Collimation Has On EI Values**
Lillie Wodskow

Humanities, Behavioral & Social Sciences

- MC **Supporting Birth: The Role of Continuous Midwife Care in Low-Risk Pregnancies**
Shae Calixtro
- MC **Evidence for Delayed Cord Clamping in Premature Neonates**
Nicole Jorgenson
- MC **Bridging the Gap: Telehealth vs In-Person Mental Health Services in Rural Communities**
Reigan Kampmann

- MC **Balancing Choices: Hormonal Oral Contraception and Reproductive Cancer Risk**
Jennifer McGuinn
- #26 **Implications of Personality Profile Comprehension on Self-Esteem and Self-Concept**
Nathan Schiess
- #14 **Empowering Patients: The Role of Early Hospice Discussions in Quality of Life**
Sydnee Thomas

2023 GRS Award Recipients

Oral Presentation Award Recipients

Top Oral Presentation in Biological & Natural Sciences

Presented to

Jeffrey Okojie

“Developing a Radioimmunotherapy for Synovial Sarcoma”

Top Oral Presentation in Business, Economics & Public Administration

Presented to

Madison Mancini

“Increasing Leader Member Exchange Through Social Exchange Theory”

Top Oral Presentation in Education, Learning & Training

Presented to

Danielle Fernandez

“The History of Games in Education”

Top Oral Presentation in Engineering, Physical & Mathematical Sciences

Presented to

Olivia Stanley

“Rock Glacier Distribution and Implications for Alpine Hydrology in the Northern Rocky Mountains”

Top Oral Presentation in Health, Nutrition & Clinical Sciences

Presented to

Arina Ranjit

“Improving Anti-Arthritic Effects of Novokinin through Bisphosphonate Conjugation”

Top Oral Presentation in Humanities, Behavioral & Social Sciences

Presented to

Jacob Harris

“The QAnon Infection: How Families Have Reacted to Members' Conspiratorial Identities”

Poster Presentation Award Recipients

Top Poster Presentation in Biological & Natural Sciences

Presented to

Brooks Myers

“Identifying Fine-Scale Qualities of Greater Sage-grouse (*Centrocercus urophasianus*) Habitat Using Natural Color and Multispectral UAS Imagery”

Top Poster Presentation in Business, Economics & Public Administration

Presented to

Rian Binte Kamal

“Empirical Analysis of Triple Bottom Line Reporting in The Banking Sector and its Determinants: Focus on Environmental Issues”

Top Poster Presentation in Education, Learning & Training

Presented to

Rifat Ara Tasnim

ARCoD: A Serious Game Approach to Measure Cognitive Distortions in Individual

Top Poster Presentation in Engineering, Physical & Mathematical Sciences

Presented to

Zayed Mohammad

“Slotted Waveguide for High Dielectric Heating”

Top Poster Presentation in Health, Nutrition & Clinical Sciences

Presented to

Arina Ranjit

“Improving Anti-Arthritic Effects of Novokinin through Bisphosphonate Conjugation”

Top Poster Presentation in Humanities, Behavioral & Social Sciences

Presented to

Jessica Woolley

“Tell Me a Real Story: Motherhood and Intertextuality”

Creative Works Award Recipients

Presented to

Pamela Pascali

“Idaho's Obsidian History: Tools and Technology, a learning module for 4th grade”

List of Student Participants

College of Arts and Letters

Alicyn Ager (Experimental Psychology, Ph.D.)
Juliette Bedard (Anthropology, M.S.)
Jacob Bingham (Clinical Psychology, Ph.D.)
Aimee Bozeman (Psychology, M.S.)
Ellie Cameron (Psychology, B.A./B.S.)
Eliana Claps (Clinical Psychology, Ph.D.)
Angelina Conrow (Clinical Psychology, Ph.D.)
Tyler Cook (Social Work, M.S.W.)
Caleb Dorcheus (Spanish, M.A.)
Lauren Elmore (Clinical Psychology, Ph.D.)
Erik González Campos (Spanish, M.A.)
Yidan Guo (Art, M.F.A.)
Leticia Herrera (Experimental Psychology, Ph.D.)
Heather Holmes (Spanish, M.A.)
Matthew Kolbusz (Spanish, M.A.)
Ailun Li (Clinical Psychology, Ph.D.)
Alleyna Martes (Experimental Psychology, Ph.D.)
Alleyna Martez (Psychology, M.S.)
Patricia Morales Lorenzo (Anthropology, M.S.)
Tanner Morton (Political Science, D.A.)
Morgan Musquez (Experimental Psychology, Ph.D.)
Md Masud Un Nabi (Communication, M.A.)
John Opeifa (History, M.A.)
Liv Peters (Psychology, B.A./B.S.)
Makenzie Peterson (Psychology, M.S.)
Brianna Prien (Psychology, B.A./B.S.)
Nathan Schiess (Psychology, B.A./B.S.)
Aubrey Skinner (Psychology, B.A./B.S.)
Ana Stalzer (Clinical Psychology, Ph.D.)
Brittany Stalzer (Clinical Psychology, Ph.D.)
Katie Stubbers (Clinical Psychology, Ph.D.)
James "JD" Wardell (Political Science, D.A.)
Jessica Woolley (English & the Teaching of English, Ph.D.)

College of Science and Engineering

Sajal Acharya (Microbiology, M.S.)
Rosemary Anibogwu (Chemistry, M.S.)
Wilgince Apollon (Environmental Science & Management, M.S.)
Ahmed Ashour (Engineering & Applied Science, Ph.D.)
Kaylyn Buchanan (Mechanical Engineering, B.S.)
Savanah Call (Chemistry, B.S.)

David Cavell (Geology, M.S.)
Arifa Islam Champa (Engineering & Applied Science, Ph.D.)
Shijon Das (Computer Science, M.S.)
Daliedmarie Delgado Maisonet (Geology, M.S.)
Aubree Denker (Biology, B.S. with Biomedical Science Concentration)
Antora Dev (Electrical & Computer Engineering, M.S.)
Alex Diviney (Computer Science, B.S.)
Bronwyn Ellis (Microbiology, B.S.)
Fatemeh Falahati Marvast (Biology, M.S.)
Nusrat Farheen (Engineering & Applied Science, Ph.D.)
McKenzie Gerdes (Mechanical Engineering, B.S.)
Icewal Ghimire (Civil Engineering, M.S.)
Md Azazul Haque (Engineering & Applied Science, Ph.D.)
Marley Harrison (Biology, B.S. with Biomedical Science Concentration)
Rachel Havok (Biology, M.S.)
Angela Hayden (Chemistry, B.S.)
Daniel Herrera (Biochemistry, B.S.)
Monte Hibbert (Engineering & Applied Science, Ph.D.)
Md Mosharaf Hossan (Computer Science, M.S.)
Raider Hunter (Chemistry, B.A.)
Daniel Igboke (Computer Science, M.S.)
Lauren Jager (Chemistry, B.S.)
Golam Gause Jaman (Engineering & Applied Science, Ph.D.)
Karl De Jesus (Chemistry, M.S.)
Anna Jirik (Biochemistry, B.S.)
Hannity Johnson (Biology, B.S. with Biomedical Science Concentration)
Joseph Kepler (Mechanical Engineering, B.S.)
Kyleigh Kowalski (Earth and Environmental Systems, B.S. Environmental Systems Track)
Phoenix Larsen (Biology, B.S. with Biomedical Science Concentration)
Jennings Leavell (Geology, M.S.)
Kaden Lee (Biology, B.S. with Biomedical Science Concentration)
Mikayla Macaluso (Biology, M.S.)
Kaden Marchetti (Computer Science, B.S.)
Ivy Marshall (Accelerated Chemistry, B.S.)
Rylee Mathison (Microbiology, B.S.)
Mya McHugh (Biology, B.S. with Biomedical Science Concentration)
Veronica Miller (Chemistry, B.S.)
Ninahazwe Mireill (Biology, B.S. with Biomedical Science Concentration)
Tanzim Mostafa (Computer Science, M.S.)
Yashodha Nyaupane (Environmental Science & Management, M.S.)
Kendal Olson (Chemistry, M.S.)
Carlyn Osterhout (Accelerated Chemistry, B.S.)
Kelsey Pella (Earth and Environmental Systems, B.S. Environmental Systems Track)
Russell Phillips (Computer Science, B.S.)
Samjhana Pradhan (Chemistry, M.S.)
Daniel Puentes Navarro (Biology, B.S. with Biomedical Science Concentration)
Md Fazle Rabbi (Engineering & Applied Science, Ph.D.)
Makenzie Reed (Biology, Ph.D.)
Madison Renn (Biology, B.S. with Biomedical Science Concentration)

Matthew Riniker (Biology, M.S.)
Mikaela Sapafford (Chemistry, B.S.)
Kyler Sayer (Chemistry, M.S.)
Michelle Sclafani (Geology, M.S.)
Andrija Sevaljevic (Computer Science, B.S.)
Trenton Shappee (Biology, B.S. with Biomedical Science Concentration)
Madalyne Sisk (Biology, B.S. with Biomedical Science Concentration)
Mason Sistrunk (Chemistry, B.S.)
Ainsley Snyder (Chemistry, M.S.)
Sara Sourani Yancheshmeh (Mechanical Engineering, M.S.)
Mikaela Spafford (Chemistry, B.S.)
Olivia Stanley (Geology, M.S.)
Adam Storms (Chemistry, B.S.)
Rifat Ara Tasnim (Engineering & Applied Science, Ph.D.)
Soni Thapa (Biology, M.S.)
Alexander Thomas (Biology, B.S. with Biomedical Science Concentration)
Aaliyah Tovar (Biology, B.S. with Biomedical Science Concentration)
Gisselle Trejo (Biology, B.S. with Biomedical Science Concentration)
Jose Tzompa (Chemistry, B.A.)
Shanae Van Leuven (Biochemistry, B.S.)
Mya Vanderpool (Chemistry, B.A.)
Beverly Victoria Bolivar (Biochemistry, B.S.)
Miriam Villa Lopez (Biology, B.S. with Biomedical Science Concentration)
Payton Walker (Biology, B.S. with Biomedical Science Concentration)
Virginia Wallace (Biology, B.S. with Biomedical Science Concentration)
Kathryn West (Biology, B.S. with Biomedical Science Concentration)
Haley Wright (Geology, B.S.)

College of Business

Matthew Elliott (Business Administration, M.B.A.)
Logan Jennings (Management, B.B.A.)
Rian Binte Kamal (Accountancy, M.Acc.)

College of Education

Aisley Allen (Sport and Exercise Science, B.S.)
Reed Hepler (Instructional Technology, M.Ed.)
Farhana Hibbert (Educational Leadership, Ed.D.)
Tingxuan Lu (Educational Leadership, Ed.D.)
JadaLin Perkins (Elementary Education, B.A./B.S.)
Sarah Wilensky (Athletic Administration, M.P.E.)

Kasiska Division of Health Sciences

College of Pharmacy

Seyedeh Melika Akaberi (Pharmaceutical Science, Ph.D.)
Eliza Borzadek (Pharmacy, Pharm.D.)
Sierra Condie (Pharmacy, Pharm.D.)
Madeline Foster (Pharmacy, Pharm.D.)
Biwash Ghimire (Pharmaceutical Science, Ph.D.)
J. Andrew Hopkins (Pharmacy, Pharm.D.)
Harrison Hoskins (Pharmacy, Pharm.D.)
Elizabeth Kara (Pharmaceutical Science, Ph.D.)
Sarah Kershishnik (Pharmacy, Pharm.D.)
Sarah Lee (Pharmacy, Pharm.D.)
Cara Liday (Pharmacy, Pharm.D.)
Rachel Lopez (Pharmacy, Pharm.D.)
Sofia Manczurowsky (Pharmacy, Pharm.D.)
Sameena Mateen (Pharmaceutical Science, Ph.D.)
Seyedeh Melika (Pharmaceutical Science, Ph.D.)
Anyaubu Nmaju (Pharmaceutical Science, Ph.D.)
Jordan Oman (Pharmaceutical Science, Ph.D.)
Srinath Pahiknati (Pharmaceutical Science, Ph.D.)
Lindsey Reeder (Pharmacy, Pharm.D.)
Renee Robinson (Pharmacy, Pharm.D.)
Pooja Sapkota (Pharmaceutical Science, Ph.D.)
Eric Sievers (Pharmacy, Pharm.D.)
Baily Stark (Pharmacy, Pharm.D.)
Tanner Tracy (Pharmacy, Pharm.D.)
Sabina Yeasmin (Pharmaceutical Science, Ph.D.)

College of Health

Dishant Aggarwal (Pharmaceutical Science, M.S.)
Lizbeth Arellano Santoyo (Health Science, B.S. Health Science Concentration)
Jordan Armstrong (Radiographic Science, B.S.)
Ashley Bakes (Radiographic Science, B.S.)
Joseph Chacon (Public Health, M.P.H.)
Claire Christensen (Nutrition, M.S.)
Sadie Cole (Public Health, M.P.H.)
Brittanie Cornelsen (Radiographic Science, B.S.)
Diana Cortez (Health Science, B.S. Health Science Concentration)
Carley Ebert (Audiology, Au.D.)
Bailey Farrer (Radiographic Science, B.S.)
Bridget Fitzpatrick (Speech-Language Pathology, M.S.)
Jessica Garner (Radiographic Science, B.S.)
Brooklynn Hammond (Health Science, B.S. Health Science Concentration)

Emory Hebdon (Radiographic Science, B.S.)
Morgan Hess (Radiographic Science, B.S.)
Victoria Higley (Radiographic Science, B.S.)
Samantha Howard (Radiographic Science, B.S.)
Sage Jackson (Radiographic Science, B.S.)
Jeanelle Jaeger (Radiographic Science, B.S.)
Macy Knudsen (Audiology, Au.D.)
Anthony Kulp (Radiographic Science, B.S.)
James Marble (Family Medicine Residency)
Alicia Martin-Cowger (Rehabilitation & Communication Sciences, Ph.D.)
Kelsey Maschek (Radiographic Science, B.S.)
Saige Meek (Radiographic Science, B.S.)
Jarrett Mitton (Public Health, M.P.H.)
Ramesh Muralimanohar (Audiology, Au.D.)
Zachary Nelson (Family Medicine Residency)
Travis Nielsen (Family Medicine Residency)
Blaine Olsen (Family Medicine Residency)
Alexis Packer (Public Health, M.P.H.)
Blair Richlin (Rehabilitation & Communication Sciences, Ph.D.)
Daisy Rosas (Radiographic Science, B.S.)
Tali Rotman (Rehabilitation & Communication Sciences, Ph.D.)
Emma Shiflet (Speech-Language Pathology, M.S.)
Maria Stoddard (Radiographic Science, B.S.)
Andy Thaine (Family Medicine Residency)
Jenn Tyler (Audiology, Au.D.)
Bailey Victor (Radiographic Science, B.S.)
Lillie Wodskow (Radiographic Science, B.S.)
Minna Yoo (Counseling, Counselor Education & Counseling, Ph.D.)

School of Nursing

Naveed Akhtar (Nursing, B.S., Accelerated)
Natalie Arroyave (Nursing, B.S., Accelerated)
Emily Bauer (Nursing, B.S., Accelerated)
Leslie Bergstrom (Nursing, B.S., Accelerated)
Amanda Bertram (Nursing Practice, D.N.P.)
Rebecca Bridges (Nursing, B.S., Accelerated)
Cristal Brown (Nursing, B.S., Accelerated)
Megan Cahill (Nursing, B.S., Accelerated)
Shae Calixtro (Nursing, B.S., Accelerated)
Emma Caron (Nursing, B.S., Accelerated)
April Chaidez (Nursing, B.S., Accelerated)
Ashley Chermak (Nursing Practice, D.N.P.)
Nicole Dewey (Nursing, B.S., Accelerated)
Julia Eaton (Nursing, B.S., Accelerated)
Brett Elliott (Nursing, B.S., Accelerated)
Lorinda Gautier (Nursing, B.S., Accelerated)
Nathaniel Griswold (Nursing, B.S., Accelerated)

Hannah Gull (Nursing, B.S., Accelerated)
Nikki Gundacker (Nursing, B.S., Accelerated)
Vikki Hanson (Nursing, B.S., Accelerated)
Emily Harames (Nursing Practice, D.N.P.)
Laura Hardy (Nursing, B.S., Accelerated)
Jake Hart (Nursing, B.S., Accelerated)
James Heberlein (Nursing, B.S., Traditional)
Holly Hood (Nursing, B.S., Accelerated)
Chantel Johnson (Nursing, B.S., Accelerated)
Nicole Jorgenson (Nursing, B.S., Accelerated)
Reigan Kampmann (Nursing, B.S., Accelerated)
Robert Kearns (Nursing, B.S., Accelerated)
Michelle Kruse (Nursing Practice, D.N.P.)
Aurora Lamm (Nursing, B.S., Accelerated)
Julie Mangum (Nursing, B.S., Accelerated)
Davis Martin (Nursing, B.S., Accelerated)
Austy Mauzy (Nursing, B.S., Accelerated)
Jennifer McGuinn (Nursing, B.S., Accelerated)
Chris Michael (Nursing, B.S., Accelerated)
Sarah Mokwa (Nursing, B.S., Accelerated)
Yvette Pham (Nursing, B.S., Accelerated)
Leighanna Pilling (Nursing, B.S., Accelerated)
Anna Przybylo (Nursing, B.S., Accelerated)
Sienna Ragle (Nursing, B.S., Accelerated)
Dayana Rodriguez (Nursing, B.S., Accelerated)
Nick Sanchez (Nursing, B.S., Accelerated)
Sophie Stands (Nursing, B.S., Accelerated)
Kaitlin Stern (Nursing, B.S., Accelerated)
Sydnee Thomas (Nursing, B.S., Accelerated)
April Thunell (Nursing, B.S., Accelerated)
Michael Vasquez (Nursing, B.S., Accelerated)
Kasey Wells (Nursing, B.S., Accelerated)
Sophia Whitehead (Nursing, B.S., Accelerated)
MaKenna Winnett (Nursing, B.S., Accelerated)
Zoe Young (Nursing, B.S., Accelerated)

Abstracts

Graduate Abstracts

Sajal Acharya

Subject: Biological & Natural Sciences

Identifying the Second Metal Binding Site in *Streptococcus pneumoniae* Phosphoglucomutase: A Study in Metal Stoichiometry

Streptococcus pneumoniae is an opportunistic bacterial pathogen that colonizes the mucosal surfaces of the human upper respiratory tract and possesses the potential to disseminate to other susceptible host sites causing severe infection. Its pathogenicity results from several virulence factors including the production of a bacterial capsule. Recent published work demonstrates that capsule expression levels in *S. pneumoniae* are modulated by manganese:zinc homeostatic levels via direct activation of phosphoglucomutase (Pgm), a manganese-dependent enzyme that catalyzes the conversion of sugar precursors for capsule biosynthesis. Pgm is capable of binding up to two metal ions per promoter in-vitro. Multi-protein sequence alignments with other structurally characterized PGM/PMM family members reveal a shared single conserved metal-binding site (BLANK). Here, we confirm the conserved metal-binding determinants in site 1 and focus further on identifying those that form site 2 in *S. pneumoniae* Pgm. Ten distinct residues (D303, R308, R48, N80, E190, N134, H238, R93, D91, N146) were selectively mutated at their chromosome native site. Cells expressing Pgm variants D303A, R308A, or R48A resembled growth of the Δ pgm strain and grew poorly compared to wild-type; all other variants grew similarly to wild-type. All variants examined by Western blot showed normal wild-type Pgm expression levels. In-vitro analysis using purified metal-free Pgm protein in competition with the mag-fura-2 metal chelator showed loss of metal-binding for D303A, R308A, and R48 Pgm variants. Together, these data strongly suggest that the growth defect does not result from poor expression of Pgm but likely from inactivation of Pgm via loss of metal binding. Future studies will involve direct assessment of Pgm enzyme specific activity. Unraveling the metal-binding determinants in Pgm serves as the first step in future development of antimicrobial agents that target metal-containing enzymes critical for *S. pneumoniae* colonization and survival in the host.

Alicyn Ager and Erika Fulton

Subject: Humanities, Behavioral & Social Sciences

Fake news! Or is it? Individual differences in fake news discrimination and knowing when you've been duped

It is critical to understand who believes fake news and if people are aware of their fake news susceptibility, in order to combat the spread of misinformation. Past research has correlated cognitive style and fake news discrimination (e.g. Bago et al., 2020; Pennycook & Rand, 2019; Ross et al., 2021) but has not tested how accurately people judge their fake news discrimination. We explored how cognitive style, political orientation, and fake news discrimination relate to metacognitive accuracy. A sample of 237 Prolific participants completed a fake news discrimination task and gave confidence judgments for each answer, followed by the Need for Closure Scale, Cognitive Reflection task, and measures of political orientation. The sample was generally overconfident, with the worst fake news discrimination performance (FND) associated with the most overconfidence, consistent with the Dunning-Kruger effect. Together the predictors accounted for a significant amount of variance in FND and FND metacognitive accuracy. More specifically, those who showed more analytic thinking and were more liberal performed significantly better on the fake news discrimination task and were more metacognitively accurate. Unexpectedly, Need for

Closure was uncorrelated with political orientation and not a unique predictor of FND or FND metacognitive accuracy. Together with previous literature, these findings suggest that encouraging people to engage in more deliberative thinking could help improve FND and FND metacognitive accuracy. Additionally, finding the typical Dunning-Kruger effect is concerning in the context of fake news, because if people with poor fake news discrimination are unaware of their susceptibility, they may be more likely to share false headlines or make decisions based on misinformation. Overall, these results provide insight into peoples' awareness of their fake news susceptibility and can inform future intervention efforts to help combat the spread of misinformation and minimize false beliefs.

Dishant Aggarwal, Rosemary Anibogwu, and Karl De Jesus

Subject: Biological & Natural Sciences

Identification and Quantification of Sesquiterpene lactones (SLs) in Sagebrush (*Artemisia tridentata*) and its chemical modification

This research is an exploratory study on the sesquiterpenes and flavonoid present in the leaves of *Artemisia tridentata* subsp. *tridentata*. The leaf foliage was extracted with 100% chloroform. Thin layer chromatography (TLC) analysis of the crude extract showed four bands. Each band was purified by column chromatography followed by recrystallization. All the components were identified and isolated by TLC, High performance liquid chromatography (HPLC), and Mass spectrometry (MS) techniques. Likewise, the structure and stereochemistry of the purified components were characterized by an extensive spectroscopic analysis, including 1D- and 2D-Nuclear magnetic resonance (NMR) and Fourier transform infrared pectroscopy (FTIR) studies. The antioxidant activities of crude extract were analysed, and their radical-scavenging ability was determined by Ferric reducing antioxidant power (FRAP) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. The antitumor properties were probed by submitting the four isolated compounds to the National Cancer Institute (NCI) for NCI-60 cancer cell line screening. The results of the one-dose assay for each SLs were overall unremarkable. Three sesquiterpene lactones (SLs) were isolated— leucodin, matricarin and desacetylmaticarin. Of these, desacetylmaticarin was the major component. In addition, a highly bio-active flavonoid, quercetagenin 3,6,4'-trimethyl ether (QTE) was also isolated. This is the first report on the isolation of this component from the leaves of *Artemisia tridentata* subsp. *tridentata*. The crude extract showed an antioxidant activity of 18.99 ± 0.51 and 11.59 ± 0.38 $\mu\text{mol TEg}^{-1}$ FW for FRAP and DPPH assay, respectively. Whereas, the activities of matricarin, leucodin, desacetylmaticarin, and QTE were 13.22, 13.03, 14.90 and 15.02 $\mu\text{mol TEg}^{-1}$ FW respectively for the FRAP assay. However, the flavonoid's one-dose mean graph demonstrated significant growth inhibition and lethality, which prompted an evaluation of this compound against the 60-cell panel at five-dose assay. Tests from two separate dates indicate lethality of approximately 75% and 98% at the $\log_{-4}[\text{M1}] [\text{A2}]$ concentration when tested against the melanoma cancer line SK-Mel 5. This warrants further testing and derivatization of the bioactive components from sagebrush as a potential source for anticancer properties.

Seyedeh Melika Akaberi, Sabina Yeasmin, Kavita Sharma, Christopher Nicolet, Danny Xu, and Marvin Schulte

Subject: Health, Nutrition & Clinical Sciences

Unveiling Neurotropic Mysteries: Decoding the Interaction Between HSV1 and Nicotinic Acetylcholine Receptors

Understanding the intricate mechanisms behind the neurotropic effects of Herpes Simplex Virus 1 (HSV1) is crucial for developing effective therapeutic interventions. Here, we explore the hypothesis that HSV1's neurotropic influence arises from its interaction with nicotinic acetylcholine receptors (nAChRs) via the glycoprotein D (gD) component. nAChRs play pivotal roles in both the central and peripheral nervous

systems and have been implicated in viral pathogenesis, as seen with rabies virus and SARS-CoV-2. This interaction may occur through shared structural motifs with the LY6 family and α -bungarotoxin (α -btx). Functional studies in *Xenopus* oocytes with $\alpha 7$ nAChRs demonstrated HSV1gD's ability to bind and inhibit $\alpha 7$ and $\alpha 4\beta 2$ nAChRs function. Surface Plasmon Resonance (SPR) binding assays using HSV1gD ectodomain and fragments, including the homologous loop, revealed binding to acetylcholine binding protein (AChBP). Through in-silico structural analyses, homology between HSV1gD and α -btx was identified, particularly in the three-fingered toxin (3FTx) loop, reminiscent of LY6 proteins. Our findings collectively suggest that HSV1gD engages nAChRs, especially $\alpha 7$ and $\alpha 4\beta 2$ subtypes, impacting their function. This interaction implicates nAChRs as potential therapeutic targets against HSV1 neuroinvasion. Moreover, both in-vitro and in-vivo investigations underscore the promise of targeting nAChRs to mitigate HSV1 infection within the central nervous system (CNS). In conclusion, this study reveals a novel avenue in HSV1 neuropathogenesis, shedding light on the intricate interplay between HSV1gD and nAChRs. Leveraging this understanding not only opens avenues for innovative therapeutic strategies against HSV1-induced neurological complications but also holds promise for addressing challenges posed by other viruses.

**Seyedeh Melika Akaberi, Sabina Yeasmin, Kavita Sharma,
Christopher Nicolet, Danny Xu, and Marvin Schulte**

Subject: Health, Nutrition & Clinical Sciences

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Ahmed Ashour and Mostafa Fouda

Subject: Engineering, Physical & Mathematical Sciences

A Novel Spectrum Injection Scheme for Enhanced Baseband Signal Reconstruction and Channel Bandwidth Optimization

With the increasing reliance on wireless technology, effective management of limited spectrum resources has become crucial. In this study, we introduce a groundbreaking approach to enhance the reconstruction of signals, aiming to improve efficiency and optimize bandwidth utilization. The focus is on a new spectrum

injection method that, when combined with existing signal reconstruction techniques, reduces the reconstruction time from 300 to 150 iterations, addressing the challenges posed by the growing demands on wireless systems. The escalating demand for wireless technology poses a challenge in efficiently managing limited spectrum resources. Current methods for signal reconstruction often involve lengthy processes and suboptimal bandwidth usage. This research addresses these issues by proposing a novel spectrum injection approach, aiming to significantly reduce reconstruction time and enhance bandwidth efficiency. The problem at hand is the need for a more streamlined and effective method to reconstruct signals in wireless systems, and our research offers a promising solution. Matlab (Coding) Our research successfully introduced a spectrum injection approach for signal reconstruction in wireless technology. The application of this method led to a substantial reduction in reconstruction iterations, from 300 to 150, showcasing a significant enhancement in efficiency. In real-world tests on a UHF RFID system operating at 640 kbps, we achieved a remarkable decrease in reconstruction iterations from 1000 to just 2 when applying the spectrum injection approach. This breakthrough not only accelerates the reconstruction process but also addresses malware challenges by utilizing infected data as an auxiliary signal. Our findings highlight a promising advancement in wireless technology, offering a glimpse into a future characterized by faster, more accurate signal reconstruction and improved system security. Our research presents a game-changing spectrum injection approach for wireless signal reconstruction. By significantly reducing the number of iterations from 300 to 150, our method demonstrates enhanced efficiency. Real-world tests on a UHF RFID system revealed an even more remarkable reduction, from 1000 to just 2 iterations, showcasing a major leap in reconstruction speed. This innovative approach not only accelerates signal recovery but also addresses malware challenges, making it a promising step forward in the realm of wireless technology. The future holds potential for faster, more secure, and efficient wireless systems based on these findings.

Juliette Bedard and Patricia Morales Lorenzo

Subject: Creative Works

Structural vulnerabilities and Indigenized harm reduction strategies for missing and murdered Indigenous peoples, Idaho

The Missing and Murdered Indigenous Persons (MMIP) crisis necessitates urgent, culturally sensitive solutions amid reporting discrepancies and a lack of cooperation between law enforcement, forensic practitioners, and tribal leaders. These issues are deeply rooted in colonial violence, racism, and discrimination, creating structurally embedded vulnerabilities within Indigenous communities. Forensic anthropologists should specialize their practice with culturally-informed and contextualized strategies to better support the populations they serve. We present a Global Information System (GIS) database and map of MMIP cases in Idaho. Mapping is merged with spatial and homicide/health data to understand whether socioeconomic status, availability of social/health services, and locations of police departments impact MMIP cases in Idaho. Next, Indigenous-created and led (Indigenized) harm reduction strategies were adopted to guide medico-legal practitioners in best practices for MMIP cases. Indigenized harm reduction, incorporating traditional knowledge and community-driven methods and reflecting cultural norms and social structures, were sourced and prioritized in developing this guide. Results demonstrate spatial patterning of MMIP correlated to the county population size, social services, and law enforcement presence. An anonymized MMIP case study is presented to demonstrate proof-of-concept for practice of Indigenized harm reduction strategies. Unlike conventional Western methods, Indigenized harm reduction is intersectional, centers community history, community engagement, and culturally-grounded knowledge of missing individuals. Overall, contextualizing MMIP cases and incorporating Indigenized harm reduction can create lasting impact by amplifying Indigenous voices and addressing systemic issues, driving a shift towards a safer, culturally informed environment for Indigenous peoples in Idaho.

Amanda Bertram

Subject: Health, Nutrition & Clinical Sciences

Exploration of a Novel Risk Stratification Process to Identify Heart Failure Patients at Highest Risk for Readmission

Patients with heart failure (HF) experience high rates of hospitalization with detrimental effects on outcomes of care, costs of care, and costly penalties to healthcare organizations. A survey was administered to participants recruited in a single outpatient HF clinic in Eastern Idaho during a 30-day period. Two participant subpopulations were identified: patients at risk for 30-day hospital readmission and 12-month readmission. Participants were tracked for instances of readmission for 30 days after survey completion. Inclusion Criteria: English or Spanish speaking, current diagnosis of HF, ≥ 18 years of age. Clinic staff contributed demographic data, current ejection fraction, and an updated medication and problem list for each participant. Chi-square analysis was performed for all comparisons. The sample size for the 30-day readmission analysis was underpowered, with $n = 12$ in the cohort, and none of the tests yielded statistically significant differences, $p > 0.05$. For 12-month readmission, the number of medications taken, $p = 0.016$, where more medications corresponded to higher rates of readmission; the number of comorbidities, $p = 0.03$, trending similarly to medications; CKD, $p = 0.03$; and anemia, $p = 0.009$ were significant factors for readmission. Patients with obesity had a lower rate of readmission compared to non-obese patients, $p = 0.03$. Similarly, patients with HFpEF were less likely to experience readmission when compared to other heart failure phenotypes, $p = 0.004$. This study contributes to evidence identifying risk factors for readmission. The study also suggests that a risk stratification process identifying patients at higher risk for readmission based on HF phenotype, the quantity of documented comorbidities and medications taken, the presence of anemia, and kidney disease may guide the level of intervention needed to prevent decompensation and hospitalization.

Nirajan Bhattarai and Marvin Schulte

Subject: Health, Nutrition & Clinical Sciences

Artificial Intelligence driven in-silico discovery of novel modulators of nicotinic acetylcholine systems

Background: The neuronal Nicotinic Acetylcholine Receptor (nAChR), a key player in brain function and neurotransmitter release, features prominently the $\alpha 7$ and $\alpha 4\beta 2$ subtypes in regions affected by Alzheimer's neuropathology. Research highlights the potential of targeting these receptors with treatment strategies such as Acetylcholinesterase (AChE) inhibitors and Positive Allosteric Modulators (PAMs) to enhance neurotransmission and offer therapeutic benefits for cognitive disorders (Terry AV, 2023; Wilkerson J, 2020; Grupe et al., 2015). Currently, there is no in-silico pipeline for the discovery of PAMs for nicotinic receptors, and the in-silico identification with AChE inhibitors needs an update with the advent of novel machine learning techniques. Method: This study employs a dual approach to enhance drug discovery: firstly, by developing an AI-driven in-silico pipeline for identifying PAMs of the $\alpha 4\beta 2$ nicotinic nAChR, incorporating data mining, few-shot learning, docking, and pharmacophore modeling; secondly, by creating a robust and validated machine learning model for acetylcholinesterase inhibitor identification, using various computational methods. Key goals include the in-vitro experimental validation of promising candidates through the two-electrode voltage clamp technique and the modified Ellman's method, respectively. Result: Our study identifies the most effective models for classifying acetylcholinesterase inhibitors: the ensemble HistGradientBoostingClassifier model with mordred features, the AutoML(tpot) model with circular fingerprints, graph convolution network, and transfer learning with chemberta model. Following extensive validation with an independent dataset (independent human, eel, cow, rat, mouse, and ray dataset) and optimization, including five-fold cross-validation, we established a prediction threshold of 0.8 for best prediction ($>95\%$ accuracy for positives) and pinpointed key

structural predictors. Screening of FDA-approved drugs, natural products from COCONUT, and ZINC's 250k purchasable compounds using these top models followed by docking showed promising hits. Additionally, we mined the chemical structure of all 50 selective alpha4beta2 structures (positives) and 40 alpha7 and other nicotinic receptor PAMs (negatives), and applied few-shot learning models showed matching networks, offering the most consistent predictions across diverse test conditions with an average accuracy of 83% for predicting alpha4beta2 PAMs till now. Conclusion: Our study has advanced the discovery of modulators for nicotinic acetylcholine receptors, identifying effective models for acetylcholinesterase inhibitors and PAMs using AI-driven techniques. These findings, validated through rigorous testing and docking analysis, promise to significantly enhance therapeutic strategies for cognitive disorders linked to receptor dysfunctions.

Jacob Bingham

Subject: Humanities, Behavioral & Social Sciences

Client, Therapist, and Researcher Beliefs about What Makes Psychotherapy Work

Several models have been proposed to explain the contribution of various therapeutic factors to psychotherapy outcomes, such as Lambert and Barley's (2002) frequently cited model that suggests 30% of the contribution is made by the client, 12% by the relationship, 8% by the treatment, 7% by the therapist, 3% by other factors, and 40% of the contribution is unexplained. However, these models primarily consider a single perspective regarding the causes of change in psychotherapy—that of the researcher. The purpose of the current study was to identify therapist and client perspectives of the factors that lead to change in psychotherapy. Participants were a nationwide sample of 149 practicing therapists recruited through online state psychological association, APA division listservs, and the APA psychologist locator website, and 232 current or former psychotherapy clients recruited from local mental health clinics in Idaho and Alaska. Based on Lambert & Barley's model, the therapists and clients were told that 40% of the psychotherapy outcome variance is unexplained and 3% is explained by other factors. They were then asked to provide their own estimates for the contribution of the client, the relationship, the treatment, and the therapist to psychotherapy outcomes. Therapists estimated that 14.92% of the contribution to outcomes is made by clients, 22.54% by the relationship, 8.72% by the treatment, and 10.82% by the therapist. Significant differences between these estimates and Lambert & Barley's estimates were found for the client, therapist, and therapy relationship ($p < .001$). The clients estimated that 18.8% of the contribution is made by clients, 14.84% by the relationship, 11.65% by the treatment, and 11.81% by the therapist, all of which differed significantly from Lambert & Barley's estimates ($p < .001$). Overall, these findings indicate that researchers hold discrepant views on the factors that lead to change in therapy when compared with clinicians and clients. By ignoring these differences, we may be missing out on valuable input from therapists and clients that may lead to better outcomes in psychotherapy. The implications of group differences in views of the factors that contribute to psychotherapy outcomes will be discussed more fully in the oral presentation.

David Cavell and Shannon Kobs Nawotniak

Subject: Biological & Natural Sciences

Mapping and Geochemical Insights into Magmatic Evolution in the eastern Snake River Plain, Idaho

This project is to conduct a detailed analysis of Sixmile Butte, a shield volcano in the eastern Snake River Plain (ESRP) of southeast Idaho during the summer, 2024. The project aims to understand the compositional change from primitive to evolved lavas for Sixmile Butte to evaluate whether the unusual lava heterogeneity there is indicative of the formation of a new evolved center. The eastern Snake River Plain is a bimodal geochemical system dominated by primitive basalt volcanoes with a few geochemically

evolved rhyolitic domes. The project will conduct a field campaign of lava flow mapping and sample collection for geochemistry across the Sixmile volcano. The collected geochemical data will be compared with that of neighboring volcanoes. Furthermore, the lava flow mapping of the edifice will help to understand the heterogeneity of the Sixmile lavas, which will provide crucial information about the eruption's progression and possible changes in the chamber. Whole rock geochemical analysis will be required to identify whether the heterogeneity of the Sixmile lavas results from a compositionally zoned chamber due to fractional crystallization, the injection of fresh magma into a chamber, or mingling between two or more discrete chambers. The mapping campaign will include mapping of flow boundaries, morphologies, flow directions, and observable mineral and vesicle characteristics. Samples will be collected from different constructional features of Sixmile Butte from the distal flow fields to the shield flanks and edifice. XRF whole rock weight percent data of the collected samples from Sixmile Butte will be used for geochemical analysis. Harker and Fenner diagrams will illustrate chemical variance between the different volcanoes to identify a possible evolutionary magmatic trend.

Joseph Chacon

Subject: Humanities, Behavioral & Social Sciences

Knowledge & Perceptions: A Path Towards Judicial Treatment Reform

Substance use and other mental health related deaths surpass cancer. Detrimental effects from past and present mishandling of mental health concerns are felt most by minority populations, with Indigenous Native Nations experiencing unique challenges. Mental health inequities are even more prominent in America's judicial system. Jails and prisons in the United States are overcrowded with people charged with low-level drug "crimes" and those with mental health needs. People with multiple arrests and people who are held for long periods of time often have more than one mental health need. Most incarcerated individuals meet the criteria for substance use disorder, and deaths attributable to substance use within America's incarceration system have exponentially increased in recent years. Court mandated treatment programs have been implemented by many states to help those proven to have mental health needs receive the care they need, and to improve communal and economic health. Treatment programs that bring positive change do exist, but like the nation, Idaho has yet to fully adopt all their principles and tenets. A non-systematic literature review was conducted to assess the available research on issues surrounding the success and effectiveness of court mandated treatment programs across the United States and within Idaho, with an emphasis on Indigenous Native Nations. From this literature review, a novel theoretical framework was developed to further understand issues impacting the outcomes of court mandated treatment programs. This investigation found three overarching and connected issues surrounding research on Court mandated treatment programs success and effectiveness within the United States, Idaho, and Indigenous Native Nations. The first overarching and connected issue found was in court mandated treatment programs' guiding documents. These guiding documents call for court mandated treatment programs' overseers and treatment team to be trained in and adhere to the use of best practices for co-occurring mental illness and substance use disorder. The second overarching and connected issue found was that court mandated treatment programs hailed accomplishments and justification for continuity have been based-on fragmented and objectively contradictory data. This has resulted in court mandated treatment programs being unfoundedly perceived as successful and effective. The third overarching and connected issue found was that court mandated treatment programs success and effectiveness was primarily dependent on two factors. One being the judge and treatment teams' perceptions on addiction and treatment for addiction. The other being the relationship between the judge, treatment team, and program participants. Shared issues surrounding court mandated treatment programs can be addressed through full adherence to the Integrated Dual Disorders Treatment model. Utilizing the Integrated Dual Disorders Treatment model a novel theoretical framework to further understand issues impacting the outcomes of court mandated treatment programs can be developed. Insight derived from

this investigation may lead to the creation of pathways that improve the individual, familial, communal, and economic health of underserved Idahoans and the nation.

Arifa Islam Champa, Md Fazle Rabbi, and Minhaz Zibran

Subject: Engineering, Physical & Mathematical Sciences

Crafting the Shield: Curated Email Datasets for Phishing Detection Using Machine Learning

Despite ongoing research efforts, the threat posed by phishing email attacks continues to rise. A significant challenge in this area is the scarcity of comprehensive and well-organized datasets that can be utilized for developing and testing email filtering technologies. In response to this challenge, we have developed and made available eleven meticulously compiled datasets, containing a total of 208,072 emails. These datasets are curated specifically for machine learning (ML) applications, aiming to effectively differentiate between phishing and legitimate emails. To validate the utility of these datasets, we conducted an extensive quantitative analysis involving five different ML algorithms to assess their effectiveness in identifying phishing emails using our datasets. Furthermore, we explored the relevance and influence of various features extracted from the emails on the effectiveness of these ML algorithms. Our quantitative evaluation shows that some ML algorithms focus on wrong features, leading to poor performance. We also find that certain features such as URLs and sender details are not being utilized fully in current state-of-the-art methods. Our comprehensive datasets and the insights gained from the quantitative analysis will significantly contribute to the development of more effective defenses against phishing attacks. By providing these resources, we aim to support the research community in creating advanced email filtering solutions that can better protect users from the ever-evolving threat of phishing.

Arifa Islam Champa, Md Fazle Rabbi, Costain Nachuma, and Minhaz Zibran

Subject: Engineering, Physical & Mathematical Sciences

Use of AI in Software Engineering: An Exploratory Study

In software development, the adoption of AI tools like ChatGPT for assistance is on the rise, but there is limited understanding of their utilization by developers and their proficiency in software engineering tasks. Through the analysis of the DevGPT dataset, this study conducts a thorough quantitative exploration into the variety of tasks for which developers seek ChatGPT's help, alongside evaluating the effectiveness of the tool in addressing these needs. Additionally, the study explores how the quality of the initial prompts influences the length of the conversations. Our results identify the areas among the 12 specified software development tasks where ChatGPT is most beneficial and highlight those where its utility is less notable. The outcomes of this research provide valuable insights for software developers, researchers, and AI tool vendors, offering direction on enhancing the efficacy of these tools as programming aids.

Ashley Chermak and Mary Nies

Subject: Education, Learning & Training

Psychiatric Technician Competency to Care for Mental Health Inpatients

Psychiatric technician health care workers care for a vulnerable population and are expected to provide patient education and maintain a safe environment, with limited education requirements past a high school or general education diploma, in the state of Idaho. An in person anonymous likert survey was completed by 11 registered nurses (out of 66) and 11 psychiatric technicians (out of 53) who provide care to mental health patients via convenience sampling, to assess if psychiatric technicians are adequately prepared and

safe to work with mental health inpatients. There is a need for states to develop policies to standardize education for psychiatric technicians.

Claire Christensen

Subject: Health, Nutrition & Clinical Sciences

Community-Based Nutrition Education and its Role in Child Nutrition

Malnutrition, including both over- and under-nutrition, is an increasingly concerning problem. As of 2013, 51 million children were at least moderately wasted at a global prevalence of nearly 8%. An estimated 170 million children are considered overweight or obese globally. Knowledge, attitudes, and practices of parents in regard to nutrition are influential determinants of nutritional status and are probable contributors to malnutrition. Nutrition education programs, including community-based programs, are one strategy to improve child nutrition status. Objectives: 1) examine the effectiveness of nutrition education counseling and school interventions on child nutrition status and 2) identify best practices for nutrition education interventions focused at children and/or parents. A literature review was conducted following the Academy of Nutrition and Dietetics Evidence Analysis Library (EAL) protocol. Multiple databases were searched using the terms “community-based nutrition education effects on child nutrition status.” Inclusion criteria included: published in the last 10 years; focus on children between the age of 1 and 18 y; and community-based nutrition education programs. Six articles were identified for review. Two articles showed positive impacts of school-based education on child intake of F/V, and low fat milk. Three articles detailed increases in parental knowledge and involvement, leading to improvement in child nutrition status. All six articles depicted improvement in eating patterns and behaviors of children. Overall, the articles showed an increase in fruit and vegetable intake for children, improvement in nutrition patterns, and increased knowledge and involvement of parents. Community-based nutrition education positively impacts and improves child nutritional status. School-based interventions that have active parent involvement have resulted in increased fruit, vegetable, and low/fat free milk consumption in children, and increased the nutritional knowledge of both parent and child. Nutrition counseling sessions are effective in improving children's eating patterns and behaviors.

Eliana Claps, Lauren Elmore, Ana Stalzer and Joshua Swift

Subject: Humanities, Behavioral & Social Sciences

Suicidality and Perceived Program Support among Clinical and Counseling Psychology Doctoral Students

Graduate students in professional psychology programs have been shown to be at an increased risk of exposure to suicidality, burnout, and financial distress, which are associated with suicidal ideation (Dejong et al., 2010; Dyrbye et al., 2008; Fiksenbaum et al., 2021; Kleepsies et al., 1993; Nanayakkara et al., 2013; Szkody et al., 2023; Warlick et al., 2021). Tasked with the recent emphasis on student self-care by the APA ethical guidelines concerning graduate students, the present study explored how self-care, program support, and other psychosocial factors relate to suicidal ideation in clinical and counseling doctoral graduate students. For this study, participants (238 graduate students recruited from APA-accredited programs) were asked to complete an online survey that included measures of stressors (i.e., academic and clinical burnout), personal and programmatic protective factors (i.e., coping ability and perceived program support), and suicidal ideation (i.e., in general and during graduate school). Correlational analyses suggested significant relations ($p < .05$) between each of the 4 predictors and suicidal ideation. A multiple regression model suggested that these predictors, taken together, explained 24.9% of the variance in suicidal ideation in the participating graduate students. In the model, academic burnout ($r^2_{part} = .01$) program support ($r^2_{part} = .03$), and avoidance-focused coping ($r^2_{part} = .05$) explained the most unique variance. Considering that inexperience in self-care techniques and exacerbating academic stress may put

student clinicians at increased suicide risk (Kleespies et al., 2010), these results may have important implications for the significance of self-care among graduate students. Specifically, this study highlights areas in which increased program support may be needed to bolster future clinician health and effectiveness. Recommendations for addressing graduate student suicidal ideation will be discussed.

Sadie Cole

Subject: Health, Nutrition & Clinical Sciences

An Evidence-Based Continuing Education Course Reducing Nurse Emotional Burnout by Reframing Bias Training

More than 40% of nurses intend to leave their jobs in the next two years, costing the U.S. healthcare system up to \$100,000 for each nurse that leaves. Research has successfully identified multiple risk factors for healthcare worker burnout, but after forty years of interventions, burnout rates remain alarmingly high. Emotional burnout is repeatedly cited as a factor that pushes nurses away from the profession. To reduce burnout, the literature recommends a systemic approach and identifies two risk factors that have not yet been addressed: societal stereotypes and patient satisfaction. This project aims to reduce nurses' emotional burnout by creating a continuing education course for clinical nurses to address multiple burnout risk factors, including societal stereotypes against nurses and patients and subsequent patient satisfaction. The course will address societal stereotypes by reframing current bias training to include common population biases against nurses. Evidence-based case studies will allow nurses to connect to personal previous experiences. Nurses will have opportunities to craft action plans to manage these biases, reduce emotional burnout, which may lead to increased patient satisfaction. Nurses will be able to measure their emotional safety improvement through course entry and exit surveys.

Angelina Conrow, Joshua Swift, Jacob Bingham, Eliana Claps and Ailun Li

Subject: Humanities, Behavioral & Social Sciences

Can AI Provide Quality Translation for Psychotherapy Research Measures?

International collaborations in psychotherapy research typically require the translation of existing measures from one language to another. In addition, psychotherapy providers may want to administer measures in their clients' native languages even when no translated versions of the measures exist. However, the typical translation process for measures can be time intensive and requires individuals who are fluent in both the original language of the measure and the language that it will be translated into (Van Widenfelt et al., 2005). AI technologies have been developed that can now fairly accurately translate text in a quick and efficient manner. The purpose of this study was to test the use of AI to translate one frequently used psychotherapy research measure (the WAI-SR) from English to Mandarin Chinese. Three Mandarin versions of the WAI-SR were created using AI programs (GoogleTranslate, ChatGPT, and DeepL). Nine psychotherapy researchers/providers who are fluent in both Mandarin and English (3 from China, 3 from Taiwan, and 3 from the US) were presented these three versions as well as a version that was translated using the traditional human process. They were asked to guess which ones were translated through AI and then provide an evaluation of each translation. Of the first seven participants, the AI versions were correctly identified 71.4% of the time. Although the human translated measure was rated to be the most accurate and fitting, the AI translated measures were also deemed suitable, particularly the DeepL version. The results suggest that traditional human translation methods are superior to AI methods; however, DeepL may be a viable substitute in some situations. Limitations and future directions will be discussed.

Shijon Das and Mostafa Fouda

Subject: Engineering, Physical & Mathematical Sciences

Short Term Load Forecasting Based on Ensemble Model: GRU-LGBM Fusion

The paper proposes an ensemble model of Light Gradient Boosting Machines (LGBM) and Gated Recurrent Units (GRU) for Short-Term Load Forecasting (STLF). The utilization of GRU's sequential learning combined with the ensemble power of LGBM is seen to outperform traditional load forecasting approaches that are not capable of capturing complicated load patterns. For predicting the load of the chosen geographic area, the time series of the load data is utilized along with the hourly weather data. The proposed ensemble model is applied to the hourly load data of the Western region from January 1, 2012, to December 31, 2015, by the Electric Reliability Council of Texas (ERCOT). The accuracy of the forecasting algorithm is seen to increase significantly after the addition of a holiday flag, day of the week, and time of the day index as categorical feature vectors. It is observed that traditional machine learning models like Random Forest, Extreme Learning Machine (ELM), and Gen-eral Regression Neural Networks (GRNN) outperformed the GRU-LGBM model with an MAE of 9.44, RMSE of 13.32, and MAPE of 0.86

Daliedmarie Delgado Maisonet and Shannon Kobs Nawotniak

Subject: Engineering, Physical & Mathematical Sciences

Surface morphometry as a control on micro-Ice Stability Regions (ISR)

The eastern Snake River Plain (ESRP) in Idaho is a valuable lunar analog due to its similarity to many volcanic regions on the Moon, particularly in basaltic plains volcanism. Like the eolian dust and soil covering ESRP basalts, lunar basalts are covered by regolith. In areas with limited light exposure, such as the lunar poles, stable ice deposits (Ice Stability Regions, or ISR) can form in the regolith. This is particularly true for Permanently Shadowed Regions (PSR), which may host surface-level water ice over millions to billions of years. The presence of ice deposits is key for NASA's future human-based exploration of the solar system, but little is currently known about the ice volume and distribution on the Moon. This project uses a terrestrial lunar analog in the ESRP to evaluate morphometric relationships that arise from progressive sediment cover burying various lava flow types, and how that evolving bulk roughness influences self-shadowing. UAS equipped with LiDAR will collect high-resolution (~1cm/pixel) elevation data, visible wavelength imagery, and thermal data from ESRP lava flows. Methods like rugosity, root-mean-square height, slope, and insolation will be used to calculate terrain roughness, shadowing, and reservoir volumes for potential ISR. The goal of this work is to generate high-resolution digital elevation models (DEM) from aerial imagery. The DEMs will provide terrain detail consistent with surface and orbital assets on the Moon.

Antora Dev and Mostafa Fouda

Subject: Engineering, Physical & Mathematical Sciences

Data-Driven Model for Improving MEG Epileptic Spike Detection

Epilepsy is a neurological disorder characterized by spontaneous recurrent seizures, affecting over 50 million people worldwide. The prompt and accurate detection of epileptic events is crucial for effective treatment and management. As traditional strategies for epilepsy detection, Electroencephalogram (EEG) has been the primary tool, where it captures electrical activity through scalp electrodes, which is potential in epilepsy diagnosis. However, EEG interpretation can be subjective, reliant on neurologist expertise, and the manual process of EEG data is time-consuming. Moreover, EEG's resolution has skull and scalp distortions, making it a challenging event for accurate localization of seizure origins deep within the brain. This has become a significant issue with the global dearth of epilepsy experts along with determining the specific timing and location of seizures. To overcome the limitations, our study focuses on analyzing brain signals using a non-invasive technique that captures detailed brain activity from the whole head. Instead of

EEG, Magnetoencephalography (MEG) is not significantly affected by the skull or scalp distortions, allowing for more accurate neural sources' localizations, especially when it comes to the deep brain origins of seizures. In this work, we employ MEG signals with a sophisticated approach to extract detailed features from these brain signals, capturing comprehensive information about brainwave patterns. These features are then analyzed using advanced machine-learning techniques to distinguish between epileptic and non-epileptic signals. Our research revealed that one of the machine learning models with the transfer learning strategy using our novel feature extraction technique outperformed others in terms of accuracy and error minimization. This model showed high accuracy in both validation and testing, effectively reducing the rate of both false positives and false negatives. This research underscores the immense potential of combining advanced signal analysis techniques with machine learning in epilepsy research. Our unique feature extraction approach, coupled with the transfer learning model highlights the importance of innovative methods in managing complex biomedical data. In future this study will establish the framework for further development in the application of deep learning to the field of neurology, with the ultimate objective of enhancing the quality of life for epileptic patients.

Caleb Dorcheus and Heather Holmes

Subject: Humanities, Behavioral & Social Sciences

Criticism of Francoism in "Las melancólicas" by Rafael Moreno Alba

Thesis: Through its exploration of a crumbling asylum, and filmed within a Spain grappling with late Francoism, Rafael Moreno Alba's "Las melancólicas" utilizes its narrative complexities to critique entrenched conservative values and expose the simmering conflict between tradition and burgeoning liberalism, reflecting a nation on the cusp of momentous socio-political change. **Abstract:** The film "Las melancólicas," dissected in the broader context of late Francoism, serves as a cinematic critique of entrenched Francoist values, encapsulating the fundamental changes in Spanish society during the 1970s. This research explores the narrative complexities of the film, contextualizing them within the historical and cultural environment of the time, in order to unravel the nuanced interaction between traditionalism and flourishing liberalism. Against the backdrop of late Francoism, Spain witnessed a confluence of political uncertainty and economic restructuring. Moreno Alba's film acts as a cultural mirror that reflects the intricate dance between tradition and progress. It unfolds within a psychiatric asylum, unraveling social abuses and echoing the broader clash between conservative and liberal forces. By examining censored scenes, this research helps to unveil the dichotomy within Spain, portraying a repressive facet versus a more progressive counterpart. Through this lens, Moreno Alba's work becomes a reflection of Spain's socio-political dichotomy on the verge of change, contributing to the understanding of the broader evolution of Spanish cinema in the post-Franco era. In essence, "Las melancólicas" encapsulates a crucial moment in Spanish cinema, embodying the socio-political zeitgeist of 1971 and laying the groundwork for the evolution of the industry after Francoism.

Matthew Elliott

Subject: Business, Economics & Public Administration

The Effects of Ransomware in Southeastern Idaho

This paper will discuss the recent ransomware attacks in the southeastern Idaho region. Along with extensive research into the effects that ransomware can have in organizations, there are several testimonials recorded that give insight into the several occurrences in the area. Medical centers and county departments were hacked within the past few years from various threat actors. These areas within the region are of interest to cyber criminals due to the amount of personal identifiable information that is collected and stored by these entities. After obtaining a hold through exploiting vulnerabilities within these systems, threat actors can exfiltrate the data stored on the local machines or servers, encrypt the data on

the local machines, and hold the information at ransom for a large sum of money. It is then the decision of these entities to either pay the ransom for a decryption key to access the encrypted files. This event causes a chain reaction that directly affects each individual (business associates to consumers/users of services) pertaining to a breach of security and privacy. It is imperative for businesses to understand what occurs during a ransomware attack and what might occur through the ramifications of such an attack. Audio recordings, transcripts, interviews with regional representatives of undisclosed medical and county locations.

Fatemeh Falahati Marvast

Subject: Biological & Natural Sciences

Investigating the regulatory role of Hic1 and Hic2 in Wnt signaling pathway during neural crest development

During embryonic development, neural crest cells (NCC) give rise to various tissues and structures, including craniofacial bones. Disruptions in NCC development can lead to various developmental disorders known as neurocristopathies. This research focuses on understanding the regulatory roles of Hic1 and Hic2, two neural crest-associated transcription factors that are linked to complex developmental disorders, in neural crest development, utilizing the African Clawed frog (*Xenopus laevis*) as a model system. Our previous work found that loss of either Hic1 or Hic2 leads to craniofacial cartilage defects via altered neural crest development. To identify genes impacted downstream of Hic1 and Hic2 loss, an RNA-sequencing experiment was performed using embryos microinjected with either hic1- or hic2-targeting anti-sense morpholino oligonucleotides (MO), or a control MO. Comparative gene expression analysis identified several classes of genes which may be coordinately regulated by both Hic1 and Hic2. Among these were several genes within the Wnt signaling pathway. Our previous work found that Wnt signaling is elevated in NCC in response to hic1 loss, although this has not been investigated in the context of hic2 knockdown. Among the factors that influence neural crest development, the Wnt signaling pathway plays a pivotal role in guiding gene expression changes during the critical process of epithelial-to-mesenchymal transition (EMT). Our experimental findings indicate that Hic1 and Hic2 may both influence the expression of key Wnt pathway genes during NCC development. We are currently using both RT-PCR and in situ hybridization to further assess how these identified Wnt pathway genes are regulated by Hic1 and Hic2. The results of this work will uncover new mechanisms influencing craniofacial development, offering potential insights into Hic1/Hic2-driven neurocristopathies. This research is funded by ISU startup funds awarded to HR.

Nusrat Farheen

Subject: Engineering, Physical & Mathematical Sciences

Model-Based Reinforcement Learning with System Identification and Fuzzy Reward Applied to Advanced Manufacturing

A model-based reinforcement learning (MBRL) allows intelligent control development from series of dynamic experiences without exhaustively interacting with the target plant. This enables wider application of reinforcement learning including Advanced Manufacturing, particularly in the field of Continuous Electric Field Assisted Sintering (CEFAS). An approach for model-based reinforcement learning (MBRL) gets presented utilizing system identification and fuzzy reward formulation. Minimum order estimation gets applied first to determine the system order. This aids transfer function approximation of the linear time-invariant system. A Mamdani fuzzy inference mechanism defines the reward signal. The model obtained integrates into the Q-learning process to simulate experiences bypassing the environment. Performance analysis provides evidence of learning improvement without explicitly communicating with the actual plant. A reduction in steady state error from 15% to 3% and settling time of 5 seconds gets

achieved. The proposed framework showcases sample-efficient learning without interacting with the true system. The applicability currently limits to linear systems. Extending the techniques to nonlinear, time-varying dynamics could increase applicability to real-world systems. This paper contributes an initial demonstration of MBRL using simple dynamics approximation and fuzzy rewards.

Bridget Fitzpatrick

Subject: Health, Nutrition & Clinical Sciences

Addressing Echolalia With Wh-Questions - A Case Study

This proposal, authored by Bridget Fitzpatrick for Idaho State University, centers on a case study evaluating the effectiveness of Direct Instruction (DI) in mitigating immediate echolalia in a five-year-old male client. Echolalia, defined as the repetitive vocalization of utterances spoken by others, is a common characteristic in individuals with autism. However, the intervention strategies for echolalia remain a subject of debate within the SLP community, often influenced by the practitioner's theoretical orientation. This case study specifically investigates the application of a DI-based procedure targeting the comprehension and use of WH-questions ("Who", "Where", and "What") during tasks that impose high constraint questions by adults, with the aim of reducing immediate echolalic responses. The intervention employed DI techniques across 20-minute sessions conducted twice weekly over a four-month period. Utilizing both physical (e.g., stuffed animals, toys, play food) and pictorial stimuli (e.g., printed pictures, books), the client was engaged in tasks that required responding to WH questions from a set of three options. Progression in task difficulty was contingent upon the client achieving 80% mastery in response accuracy, subsequently introducing questions that extended beyond the immediate context. Preliminary findings from the study suggest that DI is a viable method for enhancing the ability of children with autism to respond appropriately to WH questions, thereby reducing instances of immediate echolalia. While the intervention did not completely extinguish echolalic behavior, it significantly reduced the likelihood of its occurrence in response to targeted questions. The thesis posits that through tailored instructional strategies, such as DI, clinicians can effectively diminish echolalic behaviors in children with autism, contributing to more effective communication skills and social interactions.

Biwash Ghimire, Sana Khajeh Pur, Elizabeth Middleton, Robert A. Campbell, Mary Nies, and Ali A. Habashi

Subject: Health, Nutrition & Clinical Sciences

Renin-Angiotensin System Components and Arachidonic Acid Metabolites as Biomarkers of COVID-19

The unprecedented impact of COVID-19, caused by SARS-CoV-2, has resonated globally with widespread morbidity and mortality. The disease's multidimensional clinical spectrum calls for an understanding of intricate interactions with the physiological systems. The virus enters the cell through Angiotensin Converting Enzyme 2 (ACE2) receptors of the epithelial cells resulting in the disruption of the renin angiotensin system (RAS) [1]. The RAS disruption induces a cascade of inflammatory processes leading to induction of lung fibrosis, respiratory distress, and cytokine storms [2]. We aim to investigate if the components of the RAS and arachidonic acid (ArA) can be considered biomarkers of COVID-19. Plasma samples from 30 patients and healthy individuals were collected at the University of Utah hospital based on IRB approved by the University of Utah and Idaho State University. The plasma samples were disinfected with Triton-X and stored at -80°C until use. RAS peptides were extracted using solid phase extraction and analyzed using liquid chromatography-tandem mass spectrometry (LC-MS/MS). ArA metabolites were quantified using liquid-liquid extraction followed by LC-MS/MS analysis. Statistical analyses were performed using SPSS, with significance set at $p < 0.05$. In the infected groups, Angiotensin 1-7 levels were significantly reduced compared to controls, but there was a rise in Angiotensin II. Higher Angiotensin

II level was also associated with high sequential organ failure assessment (SOFA) scores. The levels of EETs were significantly elevated in the infected group, but the DHET levels were repressed. There was no significant change in the levels of inflammatory HETEs. The findings indicate that COVID-19 infection disrupts the balance of RAS, leading to increased levels of pro-inflammatory Angiotensin II and a diminished ratio of Angiotensin 1-7/II, which is associated with an increase in the metabolites of the ArA pathway. Evaluating these metabolites may be beneficial in early detection of high-risk groups for long-term COVID.

Icewal Ghimire

Subject: Engineering, Physical & Mathematical Sciences

Optimization of Submerged Oscillating Water Column (SWOC) Energy Harvester

Ocean waves represent a valuable green energy resource with the potential to produce 24/7- unlike solar and wind which are intermittent. Additionally, with over 50% of the US population living within 50 miles of the ocean, power from the ocean reduces transmission costs. With this in mind, a promising concept called Submerged Oscillating Water Column (SOWC) is being studied at ISU. This study proposes a new prototype design to increase the efficiency of SOWC devices. A SOWC consists of two submerged vertical pipes directing the water waves into two submerged chambers that are connected to allow the air to flow between as waves pass. As waves move over the SOWCs, the hydrostatic pressure fluctuates, causing the water level inside the chambers to oscillate. This oscillating motion can be converted into electrical energy using a power-takeoff system. Computer modeling was used to evaluate the efficiency of the proposed prototype, defined as the conversion ratio of surface waves to waves in the chambers. This study focuses on the chamber oscillations, relative to the wave oscillations, and compares it with experimental results and published research data. Key parameters investigated in this research are wave characteristics, water depth, and the vertical supply pipe diameter of the SOWC. Results indicate that the optimal diameter of the vertical pipe is a diameter of 50% of the submerged chambers, and the conversion rate is increased when the oscillating columns are positioned further apart. Notably, as the wave period increases, the efficiency also increases, ranging from 50% to 99%, which represents an approximately 20% improvement over previously proposed devices. By optimizing the design parameters and leveraging numerical simulations, this study aims to enhance the efficiency of SOWC devices, paving the way for more effective harnessing of ocean wave energy as a renewable resource.

Erik González Campos

Subject: Humanities, Behavioral & Social Sciences

From Forgetting to the Construction of a Narrative

In this presentation I argue that the story Funes the Memorious by Jorge Luis Borges can be read as a parable for the importance of forgetting in the construction of a coherent personal narrative, the story of your life. The titular character, Irineo Funes develops a perfect memory following an accident. His consequent worldview resembles the medieval philosophical doctrine of nominalism in which what are real are particular objects, and not the abstract concepts which group these objects. Funes only understands details, not ideas. I trace the refutation of nominalism found in the story that Borges borrows from John Locke and make the case that the issues presented are also impediments to the construction of a narrative. Three issues are presented with interpreting life using precise details; the immensity of the task, the unintelligibility it causes, and the idea that real meaning comes from the relation between disparate details and not the details themselves. To tell a compelling story we must be able to filter out what's important to tell, speak generally enough so that others may understand, and make connections between events to create a plot.

Yidan Guo

Subject: Creative Works

Women Who Are Asian Immigrants: The Seen and Unseen

My life started over again the day I arrived in the United States ten years ago. I experienced things that I took for granted in my previous life in China but had to learn them all over again here in the US. In daily life, I am often asked, "Where are you from?" My appearance and foreign accent do not blend within American society. My English continues to improve; sometimes I feel that I can understand people and engage in conversations in a seemingly fluent manner. On other occasions, I hear words and sentences quite clearly, but cannot understand. During these moments, I become acutely aware of being an outsider. These experiences are the driving force behind my work. My personal experience is not unique and is shared by most adult immigrants. To most first-generation adult immigrants, these life changing experiences are often dramatic and transformative. As a woman who is an Asian immigrant and artist, I pay extra attention to other immigrant women, especially Asian immigrant women. *Women Who Are Asian Immigrants: The Seen and Unseen* is my thesis project. It's a series of painted portraits of Asian immigrant women. The series is based on my interactions with the women whom I invited to participate and interviewed with. The work explores the topics of migration, displacement, fluid identities, and humanity. The goal for this project is to reveal Asian immigrant women's individuality, their fluid identities in different aspects of their lives; their mental states that relate to their lived experiences, their spirits, dignity, resilience, and shared humanity.

Md Azazul Haque

Subject: Engineering, Physical & Mathematical Sciences

Modeling and Implementation of a Flamelet Based Model With Presumed Shaped Probability Distribution Function Integration in Fortran for Laminar Non-premixed Flame Dynamics

Numerical modeling of combustion dynamics for various applications is a complex problem that involves flow-chemistry interaction and requires the implementation of efficient numerical schemes. Computational modeling of turbulent combustion is essential in predicting different combustion attributes like flame stability and heat release. Despite being a reasonable alternative to the experimental data, the modeling approach also requires tremendous computational resources. To address this, the work presented here involves developing a Computational Fluid Dynamics (CFD) code in FORTRAN using high-order finite element method to discretize the NS mass, momentum, energy, and mixture fraction equations. The flamelet model uses laminar flame components in turbulent flame, where the laminar flamelet characterizes the local structure at each point on the flame front. The flamelet model along with the β (beta)-PDF integration for species transport and temperature distribution are incorporated into the code to predict various thermochemical variables (such as temperature, and species concentrations) in terms of the mixture fraction based on data from the flamelet table. The steady-state flamelet libraries are generated from a zero-dimensional chemical kinetics solver Cantera in MATLAB with dependencies on mixture fraction and scalar dissipation rate. The model has been used for ethylene-air non-premixed combustion and validated against published experimental data.

Emily Harames

Subject: Health, Nutrition & Clinical Sciences

Lights, Camera, Conversation! A Community Movie Day for Advance Care Planning Readiness

Community-dwelling adults are not adequately prepared to engage in the advance care planning process. Improving readiness for the advance care planning process among community-dwelling adults is an important first step in improving advance care planning rates within the community. This project aimed to improve readiness for advance care planning among community-dwelling adults through a community movie day event. The format of this event was intended to make advance care planning discussions more approachable and enjoyable. The community movie day event was held on November 4th, 2023, where participants attended a screening of the 2007 film "The Bucket List" at the local movie theater. This community event was held free of charge and open to the public. Community partnerships with local businesses sponsored the event. Upon arrival at the event, participants completed a pre-survey questionnaire. The educational intervention involved a 10-minute presentation about advance care planning. Following participation in the intervention, the post-survey was administered. Mixed-methods results were based on survey scores and participant verbal feedback. The event had 91 people in attendance, with 74 participants who completed the pre-survey. 60 participants completed the post-survey (dropout rate 17.57%, n=13). T-test analysis was conducted, showing a statistically significant improvement in average readiness scores following the intervention ($p < 0.001$). Common themes among participant feedback included an overall enjoyable experience at the event and an increased consideration of advance care planning. The community movie day event is a fun, effective method of improving readiness for advance care planning. Similar events can be implemented in other communities to improve readiness for advance care planning engagement. Community health educators may adapt this event to fit advance care planning education needs within their own communities.

Rachel Havok

Subject: Biological & Natural Sciences

Searching for Patterns that Lead to Invasive Success in Novel Environments: Genetic Variations Among *Chorispora tenella* Populations

Invasive plants have found a way to thrive despite anthropogenic and climate change stressors. They're advancing in environments that are often novel to their home conditions, causing others to struggle in their original lands. Invaders can limit our resources by disrupting crop production. *Chorispora tenella*, also known as blue mustard, is one such species. It's currently known to lower grain yield by more than half. To add to its detrimental effects on this staple food, it also has been identified to have the potential for herbicide resistance. Originally from southern Russia and southwestern Asia, blue mustard can now be found taking over disturbed landscapes across much of the North American continent. It's on the invasive list of 5 states and recognized as 'present', and often 'troublesome', in many others. Looking at differences between populations could begin to tell us how variation was introduced to the invaded range and if it contributes to blue mustard's invasion success. My project will begin that investigation by conducting a population genomic analysis. Studying noxious plants, like blue mustard, could help us capitalize on their invasiveness by identifying what contributes to their success. Adding to the genomic data could ultimately inform us on how not only to work around them, but also fortify the plants that we depend on. I'll be using a sequenced data set collected from tissue samples across 36 blue mustard populations, 3 individuals from each. These have been sequenced using the ddRAD method creating numerous segments of un-assembled reads. Blue mustard does not currently have a reference genome, so I will be using a de novo approach to

assemble these paired end reads. From there variants can be identified and compared between populations. Then approaches like phylogenetics, population structure, and principal component analysis will be used to interpret this data.

Hepler Reed

Subject: Education, Learning & Training

Navigating Benefits and Concerns when Discussing GenAI with Educators and Staff

The author works as a Digital Initiatives Librarian and is earning a second Master's Degree in Instructional Design and Technology. He viewed ChatGPT (and Generative AI in general) immediately as yet another technology that could be useful. When differing viewpoints regarding ChatGPT and other AI tools quickly made themselves known, he immediately sought to demonstrate that AI could be used similarly to other technological tools. He harnessed the elements of the TCoP (Technology Consumer or Producer) model and the COSTAR framework. Using these ideas and his own experience, he presented, discussed, and wrote about generative AI, its ethical issues, and its uses and impact on education. In this presentation, Reed shares his insights regarding providing guidance, instruction, and training to educators about generative AI.

Leticia Herrera, Diana Cortez, Hannity Johnson, Kaden Lee, Liv Peters, Aubrey Skinner, Aimee Bozeman, Alleyna Martez, and Michele Brumley

Subject: Humanities, Behavioral & Social Sciences

Steps to Recovery: Does Treadmill Training Improve Locomotion in Spinal-Transected Rats?

Spinal cord injuries (SCI) often result in sensory and motor dysfunctions, yet there is an increased potential for recovery if the injury occurs during early development. The developing nervous system exhibits remarkable adaptability and plasticity, and treadmill training has been used to improve locomotor performance in individuals with SCI. This study aims to determine the effects of treadmill training on the locomotion of neonatal spinal-transected rats. On postnatal day 1 (P1), rats were placed into eight groups (2 sexes x 2 surgery conditions x 2 training groups x 10 subjects per group) for a total of 80 subjects. Half the subjects received treadmill training from P10 to P17 for three 10-minute sessions per day while the other half did not receive treadmill training. On P18, spontaneous locomotion was recorded in an open-field for a single 20-minute session per subject. The duration of full, partial, and non-weight-bearing hindlimb activity will be scored and analyzed with a series of multi-way ANOVA tests. Spinal-transected rats are expected to show less full weight-bearing motor behavior compared to sham rats; however, we expect treadmill training will reverse this effect. Further, we expect that treadmill-trained rats from both surgery groups will show more weight-bearing motor behavior. This study will yield insights into the role of sensorimotor training in shaping the developing central nervous system following an early spinal transection.

Farhana Hibbert

Subject: Education, Learning & Training

National Service Learning in Higher Education

American educator John Dewey (1938) taught that service learning builds on past student experience in order to provide students with increased skills necessary to participate in democracy. Further, he noted that service learning provides students with experiences that can increase civic engagement and better prepare students to participate in their communities (Dewey, 1938). This research is founded on his theory and seeks to explore whether qualitative research of the largest service learning program in Idaho will

support his theory. Since the aim is to explore the national service program with greater depth and understanding, qualitative research practices will be used. The research will include a visit to the natural setting where the AmeriCorps members conduct their service. The study is a single case evaluation of an AmeriCorps program at Idaho State University, using interviews, observations and document analysis to triangulate findings. The researcher will collect data through examining documents, observing behavior, and interviewing participants in the field at the site where participants experience the issue or problem under study (Creswell & Creswell, 2018). Multiple sources of data will be used, including interviews, observations, documents, and program websites. The researcher will begin to “work inductively, building patterns, categories, and themes from the bottom up by organizing the data into increasingly more abstract units of information” (Creswell & Creswell, 2018, p. 181). The inductive process leads the researcher to a various set of themes. Then, deductive thinking plays an important role as the analysis moves forward. The researcher looks at the data and the themes and decides if additional evidence may be used to support each theme or whether he or she needs to gather more data or information. This process helps create a more vivid and realistic picture of the problem or issue being studied.

Chikashi Sato, Wilgence Apollon, Alejandro Isabel Lina-Maldonado, Noris Evelin Paucar, Monte Hibbert, and John Dudgeon

Subject: Engineering, Physical & Mathematical Sciences

Integrating Microbial Fuel Cell and Hydroponic Technologies Using a Ceramic Membrane Separator to Develop an Energy–Water–Food Supply System

As climate change concerns increase and the world population grows rapidly, the demands for renewable energy, freshwater, and food will surely rise, accompanied by the need for the treatment and reuse of wastewater. This study aimed to develop an energy–water–food supply system capable of generating electricity, producing edible plants, and treating wastewater. In this study, a microbial fuel cell was integrated into a hydroponic system (MFC-Hyp) using a ceramic membrane as a separator. The MFC-Hyp is a passive system that allows the transport of nutrients from wastewater in the microbial fuel cell (MFC) to water in the hydroponic vessel (Hyp) through a ceramic membrane separator, with no external energy input. The performance of this system was examined using potato-process wastewater as a source of energy and nutrients (K, P, N) and garlic chives (*Allium tuberosum*) as a hydroponic plant. The results showed that based on dry weight, the leaves of *Allium tuberosum* grew 142% more in the MFC-Hyp than those of the plant in the Hyp without the MFC, in a 49-day run. The mass fluxes of K, P, and NO₃⁻-N from the MFC to the Hyp through the ceramic membrane were 4.18 ± 0.70 , 3.78 ± 1.90 , and $2.04 \pm 0.98 \mu\text{g s}^{-1}\text{m}^{-2}$, respectively. It was apparent that the diffusion of nutrients from wastewater in the MFC enhanced the plant growth in the Hyp. The MFC-Hyp in the presence of *A. tuberosum* produced the maximum power density of $130.2 \pm 45.4 \text{ mW m}^{-2}$. The findings of this study suggest that the MFC-Hyp system has great potential to be a “carbon-neutral” technology that could be transformed into an important part of a diversified worldwide energy–water–food supply system.

Md Mosharaf Hossan and Rifat ara Tasnim

Subject: Education, Learning & Training

Interactive Gameplay with Heart Rate as the Controller to control player anxiety

Video games have demonstrated its impact beyond ‘entertainment only’ in numerous applications on various fields including health. With the technological advancement, hand-held devices equipped with various sensors have enhanced opportunities in serious game research for health. Researchers have found that playing video games can have a positive effect on cognitive, motivational, emotional, and social domains. Considering this aspect, scientists have applied the concept of serious gaming in various sectors

of health such as detecting and assessing psychological disability, improving the efficacy of existing techniques, educating and training people to help individuals suffering from mental disorders. This gamified approach has been used to treat several mental disorders such as phobias, stress-related disorders, depression, eating disorders, and chronic pain. Stress is identified as one of the key factors of medical disorders such as diabetes, cardiovascular disease, gastrointestinal issues and various mental health disorders such as PTSD, OCD, anxiety and depression. Without treatment in a timely manner, these diseases can cause disability and death. A significant portion of these affected people cannot receive service due to the lack of convenience to access the service or due to physical disability. Because of negative stereotypes and misinterpretations, the willingness to seek help when the individual is suffering from mental breakdown is challenging. Under these circumstances, a gamified digital environment deployed in handheld devices such as cell phones can play a tremendous role in terms of accessibility as well as functionality. Maintaining stress level can reduce chances for fatal disease mentioned above. In this project, we aim to provide a gamified digital platform to control the stress level by enforcing game-play action via the player's heart rate. We have developed a version of famous Flappy Bird game, where the players can achieve their goal with a certain heart rate level.

Golam Gause Jaman

Subject: Engineering, Physical & Mathematical Sciences

Precursor Detection of Spike Stall in Axial Compressor Systems using Machine Learning Fusion.

Commercial Jet engines among others use axial compressors. An axial compressor can experience spike stall events that lead to performance drops and damage that may even lead to a stalled jet engine during mid-operation. A stall event precursor detection system could prevent any incoming spike stall event by applying active control measures. This study aims to develop a spike stall precursor detection system using deep learning on pressure data from a 60-blade compressor system. In the study, Recurrent Neural Networks like LSTM and GRU are explored for binary classification of impending spikes. Spatiotemporal features are constructed and graphical networks are fused with the Recurrent Neural Networks to gain insights into the nature of the precursor data. The method is validated using the data provided by the Chinese Academy of Science. In addition, the data is augmented to increase the volume of the data for effective training and testing. The models achieve 93-100% accuracy in detecting spikes 30 revolutions before the stall event. This enables more efficient operation by avoiding instabilities. Further improvements are possible by expanding the dataset, model complexity, and evaluation metrics. The prospect exists to deploy the algorithms for enhanced efficiency via instability avoidance at near-optimum conditions. Deep learning techniques are applied for spike stall precursor detection in a 60-blade axial compressor using pressure data. Models including GRU, ConvLSTM, GNN-GRU and GNN-ConvLSTM achieve 93-100% accuracy in detecting spikes 30 revolutions prior to stall. Graph sequences provide interpretable visuals alongside pressure data. The framework establishes deep networks' capability for reliable early warning of compressor instabilities from transient measurements. This could enable more efficient operation by preventing instabilities. Extensions include larger datasets, finer precursor distances, and sequence optimization. Overall, the data-driven approach offers a path to operate compressors closer to peak efficiency.

Rian Binte Kamal

Subject: Business, Economics & Public Administration

Level of Triple Bottom Line Reporting Coverage: A Study on the Banking Industry of Bangladesh

This is an exploratory research paper to understand the level of corporate social responsibility in Bangladesh's private banking sector and to emphasize the need for private banks to enhance their corporate social responsibility. Corporate social responsibility (CSR) is a concurrent topic related to triple bottom line reporting and has significant ties with sustainability reporting. Content analysis has been done to find out the total words disclosed. Three dimensions of triple bottom line reporting have been identified. The strategy includes examining these banks' yearly reports to understand CSR acts. The findings of this study suggest that private banks in Bangladesh report challenges in maintaining sustainable performance on three dimensions. As per the study, private banks need to disclose relevant information about social and environmental factors, and the regulating body should provide a comprehensive guideline.

Elizabeth Kara

Subject: Health, Nutrition & Clinical Sciences

New Molecular Entities Protect Hair Cells Against Aminoglycosides-Induced Ototoxicity

Aminoglycosides are one of the most commonly-used classes of antibiotics worldwide. They are a highly effective treatment against sepsis and chronic infections, particularly among cystic fibrosis and tuberculosis patients. However, permanent hearing loss and/or balance disturbance occurs in up to 20% of patients taking aminoglycosides. Despite this debilitating side effect, there are currently no FDA-approved therapies to prevent aminoglycosides ototoxicity. A novel chemical entity (DXU656683) and its analogs have been identified in hit-to-lead expansion drug screening campaign. Preclinical characterization of their otoprotective efficacy was carried out using in vivo zebrafish assays. DXU656683 and analogs were tested for otoprotection across the aminoglycosides drug class, including gentamicin, neomycin, kanamycin, tobramycin, amikacin, streptomycin, sisomicin, ribostamycin, and geneticin (G418) in acute and chronic exposure models. Additional experiments such as Texas Red-conjugate gentamicin uptake assays, ROS and inflammatory responses, and TUNEL hair cell apoptosis assays have attempted to characterize these entities' mechanisms of action. E. coli growth inhibitory assays are planned to test its effect on aminoglycosides antibacterial activity. In vivo zebrafish assay results show that DX656683 and some structurally similar analogs offer substantial otoprotection across the class of aminoglycosides. DXU656683 does not appear to act as an MET channel blocker, so further testing will be carried out to elucidate mechanisms of protective action. We have demonstrated the potential otoprotective efficacy of DX656683 and its analogs in our preclinical studies and determined the optimal dose against the entire class of aminoglycosides. Further characterization of this molecule and analogs may give insight into essential structural motifs and mechanisms of action. In vivo rodent ABR/DPOAE studies are planned to establish its efficacy in mammalian models. Given its broad protection against aminoglycosides in clinical use, DX656683 holds the promise to be an effective drug candidate for aminoglycosides ototoxicity prevention.

Macy Knudsen, Curtis Billings, Ramesh Muralimanohar, and Carley Ebert

Subject: Health, Nutrition & Clinical Sciences

Neural representation of noisy and reverberant speech

Understanding speech in the presence of background noise can be difficult, especially when it occurs in enclosed reverberant spaces. Variability in performance is likely due to a combination of factors including room and noise characteristics. A physiological measurement of noise and reverberation effects may aid in our understanding of the performance variability across individuals in complex listening environments. The purpose of this study was to determine how neural encoding is differentially affected by reverberation, noise masking, and the combination of the two. We hypothesized that increasingly complex environmental interferences would result in weaker electrophysiological responses. The cortical N1 and cognitive P3

auditory evoked potentials were obtained from adults with normal hearing thresholds. A complex oddball paradigm consisting of multiple consonant-vowel targets and non-targets was used. Four consonants and four vowels spoken by eight talkers were used. These tokens were then prepended with a /di/ syllable to create 128 two-syllable test tokens that contained realistic masking in reverberant contexts. These tokens were presented in five conditions: (1) anechoic, (2) background babble, (3) reverberation, (4) background babble + reverberation, and (5) reverberation + background babble+reverberation. Five randomized runs for each condition were completed in which participants were instructed to press a button whenever they heard the target consonant. Increasing complexity of environmental interferences resulted generally in weaker cortical evoked potentials. The background noise affected these evoked potentials more than the reverberant conditions. There were minimal effects of increased environmental interference on cognitive evoked potentials and increasing levels of environmental interference resulted in greater consonant confusions. Real-world listening environments rarely contain noise and reverberation in isolation. This study determined the separate and combined effects of noise and reverberation on neural encoding to help explain the variability in speech intelligibility among listeners in active listening contexts.

Matthew Kolbusz

Subject: Humanities, Behavioral & Social Sciences

Operating Queer under the Cuban Regime

Focusing on Reinaldo Arenas' autobiography, this research examines the life of a queer man in Stalinist Cuba. Born into poverty in the Cuban countryside, Arenas became a renowned counter-revolutionary writer. His first-person narrative reveals the challenges faced by Cubans during the Cuban Revolution (1953-1959) and the subsequent oppressive regime (1959-2008). We explore the methods used to detect homosexuality and the measures taken to suppress any signs of being labeled or seen as a 'homosexual.' This examination unveils severe punishments, such as imprisonment and public humiliation, acting as impetuses for fear that create a clandestine space for individuals to navigate authentic expression. Judith Butler's theory of gender performativity is analyzed, highlighting how those challenging heteronormative norms used metaphorical masks to fit into repressive society. Arenas portrays how queer characters adapted their emotional and behavioral masks to seek future freedom, distancing themselves from everyday threats under Stalinist oppression. This presentation will emphasize the struggle for identity in a context of repression, underscoring the need to conceal true identity to avoid persecution. It offers a reflection on the complexity of identities in oppressive environments and the constant pursuit of freedom and authenticity. Psychological concepts such as masking, self-monitoring, passing, social identity theory, and impression management will be analyzed to maintain undetectability. Ultimately, it posits how gender performativity becomes a survival mechanism for those whose identity defies established social norms. *Antes que Anochezca* por Reinaldo Arenas [Before Night Falls: A Memoir by Reinaldo Arenas]

Michelle Kruse and Cathy Arvidson

Subject: Health, Nutrition & Clinical Sciences

Effects of Physical Activity on the Mental Health of Older Adults

The purpose of this project is to measure the effects of group exercise on the mental health and fear of falling among older adults. Depression and anxiety are the most common psychiatric illnesses among older adults. Given the aging population, the mental health of older adults is a public health concern. Exercise and social connection can combat the severity of issues that contribute to poor mental health throughout the aging process. This project involves the measurement of depression, anxiety, and fear of falling among older adults before and after the completion of a semester "Over 60 and Getting Fit". This fitness class provides a free opportunity for older adults to exercise and socialize with others of similar

age. Three widely used surveys were employed to assess the mental health and fear of falling among older adult participants; GDS – 15, GAS – 10, and Short FES-I. Surveys were printed, and convenience sampling was used to disperse surveys. Scores from the start of the program and the conclusion of the program were measured and compared Welch’s T-Tests. Scores on the GDS-15 were significantly lower at the conclusion of class with a P value of .01; indicating a significant reduction in depressive symptoms. There were no statistically significant differences in the scores for the GAS– 10 or the Short FES-I between the beginning and end of the program. However, the average scores of these two surveys decreased. The results suggest physical exercise in a group format has a positive impact on the mental health of older adults. By providing evidence that the program benefits the older adult’s mental health, this program will have an increased reason to receive funding. Healthcare providers in the southern Idaho area should be encouraged to promote this program to older adult patients.

Tingxuan Lu

Subject: Education, Learning & Training

Integrating A Simulation Platform for ESL Teacher Candidates Training: A Case Study on Lesson Planning and Delivery

Classroom observations and practicums have traditionally been the primary methods for pre-service teachers to gain practical teaching experience. However, the COVID-19 pandemic has significantly disrupted the educational landscape. It not only reduced opportunities for pre-service teachers to engage in in-person teaching and learning experiences but also highlighted a significant gap in the ability of pre-service teachers to demonstrate mastery of specific teacher performance expectations within online teaching format (Hill, 2021). Additionally, pre-service teachers often lack proper training in using digital technology in ELL education, which contributes to ineffective teaching practice (Kartchava & Chung, 2015). Due to various language instruction educational program models implemented in schools, differentiated instruction is hard to practice in real classrooms for pre-service teachers. To ensure pre-service ESL candidates mastery technologies and relative teaching pedagogies, this study involved customized simulations and assisted technologies to provide new innovative experiential learning and teaching opportunities for ESL candidates. Simulations provide a controlled, yet authentic, safe environment where ESL candidates can practice, experiment with, and enhance their teaching abilities without the immediate pressures of a real classroom (Alessi & Trollip, 2001; Ersozlu et al., 2021; Lajoie, 2022). Cook et al. (2013) conducted a systematic review and acknowledged that simulation-based instructional design could support practices such as cognitive interactivity, multiple learning strategies, feedback, and individualized learning. Lajoie (2022) emphasized the value of simulation that “provided dynamic assessments providing individualized feedback on the learner’s success or failures and thus increasing learning opportunities” (p. 462). Thus, utilizing a simulation platform allows ESL candidates to expose to a variety of teaching scenarios, encompassing different language proficiency levels, grade levels, and student behaviors. Furthermore, this study promoted the use of Chat GPT-3 by ESL candidates to refine lesson plans since Chat GPT could provide new ideas for lessons and facilitate differentiated instructions and accommodations for learners who have different language proficiency levels (Bloese, 2023). What is more, the simulation required ESL candidates to deliver instructions online, thereby gaining proficiency in new assistive technologies aimed at enhancing teaching effectiveness and student engagement. Qualitative method The findings from the study reveal that the simulation practices provided ESL candidates with valuable insights into their teaching and learning, allowing them to identify both strengths and areas for teaching practice in their future classrooms. These simulated experiences enhanced their teaching and technological skills in lesson planning and delivery. Furthermore, simulations raised their awareness of the importance of language proficiency and the social-emotional facets of teaching English language learners in virtual settings. ESL candidates also recognized challenges of teaching online included delivering instruction to students with differing levels of language proficiency, overcoming the constraints of online

learning environments, and addressing the diverse needs and providing differentiated instruction present in a classroom scenario. The simulation practice offered a safe and positive setting for candidates to enhance their teaching skills, identify the unique needs of ELL students, develop online teaching strategies, underscore the significance of differentiated instruction and accommodations, and afford candidates additional practice and learning time to acquire more effective teaching abilities prior to entering the real classroom environment.

Mikayla Macaluso and Kathryn West

Subject: Biological & Natural Sciences

Investigating Masp1 Proteolytic Function During Early Development in *Xenopus laevis*

Carnevale, Mingarelli, Malpuech, and Michel's (3MC) syndrome are autosomal recessive disorders caused by a mutation in the MASP1 gene that encodes mannan-binding lectin serine protease 1 (Masp1), an enzyme associated with the lectin complement pathway of the innate immune system. Patients with this syndrome present with craniofacial dysmorphia and learning disabilities, phenotypes that cannot be explained by the known immune function of Masp1. Here, we are using the African Clawed frog, *Xenopus laevis* (X.l.), to determine the function of Masp1 during embryonic development. Microinjection of in vitro transcribed masp1 mRNA (overexpression) or morpholino (knockdown) results in a dose-dependent effect on cement gland size. While Masp1 functions as a protease in innate immunity, it is unknown whether Masp1 acts as a protease in the context of cement gland development. Through site-directed mutagenesis, we have generated a masp1 protease-dead (pdmasp1) mRNA. Comparison of pdmasp1 with masp1 overexpression embryos will reveal whether Masp1 protease activity is required for our observed cement gland phenotype. In addition to changes in cement gland size, other anterior structures show altered proportions in response to masp1 manipulation, suggesting that multiple ectodermal populations may be affected. In Situ Hybridization (ISH) of genes associated with different ectodermal cell populations, including otx2, pax3, and xk70, is being performed to identify how ectodermal populations are altered in response to changes in masp1 expression. Overall, our results will show how Masp1 is involved in the development of cranial ectodermal cell populations that could explain the multiple tissues affected in 3MC syndrome.

Ivy Marshall

Subject: Engineering, Physical & Mathematical Sciences

Serial Number Restoration

When items such as firearms or vehicles are stolen, the thieves will often deface the serial number on the stolen item by filing it off or defacing it by other methods. The current approved methods used to recover the number employ a destructive etching technique where an acid or base solution is placed on the defaced area. This technique cannot be repeated on the same piece of evidence since the etching destroys the remnants of the serial number in the process. Past efforts have shown that heating the metal and imaging the heated metal with an IR camera, followed by use of image processing techniques to cull out the defaced serial number have shown promise. This is done by the sample being heated and allowing the camera to see the thermal imprints of the filed off serial numbers. Additional experiments will be performed on serial number coupons purchased from a vendor that supplies these to forensic labs after we deface them with a file or by machining it off. After the serial number has been recorded and files off, the area where the serial number was will be coated in either an orange or black paint to aid in the heating process. We will study the effect of the following on the accuracy of the recovery: heating laser power and wavelength, heating pulse duration and frequency, initial temperature of defaced specimen, focal point of the camera, and laser beam profile. For this project, data is collected on an IR camera using a FLIR program on a computer that the camera is connected to. After the pictures are taken, the pictures are then put onto

a flash drive to be moved to a different computer where the data can be analyzed. After it is put into the program ran on matlab, and written by a previous student who worked on the project. After the data is collected the numbers that the computer comes up with is compared to what the number originally was. So far the results have been promising. There are times when the code will get similar numbers mixed up. This happens with numbers such as 8 and 0, as well as 5, 7, and 2.

Alicia Martin-Cowger

Subject: Health, Nutrition & Clinical Sciences

Health Outcomes of Children Taking Over-the-Counter or Prescription Reflux Medications

Current debates around the use of reflux medications in children are concerned with whether healthcare providers are over-pathologizing reflux. The health outcomes of infants and children with gastroesophageal reflux and gastroesophageal disease (GER/GERD) who receive medication intervention are not well understood. This study included 5,362 individuals six years old and younger from the 2013-2020 U.S. National Health and Nutrition Examination Survey (NHANES) cycles. Self- or caregiver-reported measures included were questions on healthcare usage patterns, number of hospital stays, use of over-the-counter (OTC) antacids, birthweight, breast-feeding durations, and self- or caregiver-ratings of overall health. Preliminary results suggest children on prescription reflux medications had significantly greater odds of having an inpatient hospital stay in the previous year (OR=7.1, 0.001) while children taking OTC antacids were not significantly associated. No significant difference was found between a child receiving breastmilk and their use of prescription or OTC reflux medications. Children taking prescription reflux medication were predicted to receive breastmilk for 75 fewer days (p=0.005) when compared with children not taking this type of medication. Ratings of a child's health status were not significantly associated with the use of prescription or OTC reflux medications. Preliminary results suggest that a child's use of prescription reflux medication may present as a risk factor for a child's odds of experiencing an inpatient hospital stay. In addition, children taking these medications may have an increased risk of earlier weaning from breastfeeding or EBM by bottle when compared with children who do not take prescription medication.

Sameena Mateen and Srinath Pahiknati

Subject: Biological & Natural Sciences

Total synthesis of Spisulosine and its anti-cancer results from NCI-60 cell lines screening.

Every year cancer is responsible for approximately 600,000 deaths in US alone.¹ Despite cancer therapy has undergone a significant revolution in the past few decades with the introduction of novel treatments, life expectancy in patients with aggressive cancers is still limited. This limitation is due to enhanced tumor cell plasticity, promoting drug resistance. This urges the search for new drugs that induce cancer cell death by some other mechanisms. Natural products or pharmacophores derived from natural products demonstrate fewer side effects, our research is based on sphingolipid-based natural products which have been showing remarkable anti-cancer potential. The dysregulation of sphingolipid metabolism in various human cancer types suggests that bioactive sphingolipids are vital for tumor growth and survival. Sphingolipids play key roles in the regulation of cancer cell signaling to control tumor suppression or survival. In the ceramide pathway, ceramide is a bio-effector sphingolipid that mediates cell death, whereas sphingosine-1-phosphate (S1P) induces tumor cell proliferation, resistance to therapy, and metastasis. Therefore, developing effective cancer therapeutic treatments may require the regulation and balancing of sphingolipid metabolic pathways. A novel synthetic scheme figure-1 has been designed with ease of scalability and starting from chiral pool L-Alanine, a naturally available Amino acid. The synthesized Spisulosine was characterized by ¹HNMR, ¹³C-NMR and LCMS. NCI-60 panel cell line assay for the

anti-cancer was performed. The results were very promising with 0.2 mM GI50 value against the triple negative breast cancer. Sphingolipid natural products (Spisulosine) and their mimics have the potential to interfere with sphingolipid biochemistry. The basic core 1,2-anti-amino alcohol with heteroatom system defines the type of sphingolipid. Diastereoselective synthesis of these sphingolipid mimics is achieved using innovative chiral pool strategy, chelation-controlled reduction, and C-C bond formation strategies. Structure-activity relationship (SAR) of these natural products provides rationale for biological significance of sphingolipids. The novel synthetic approach has paved the way to synthesize several analogs efficiently and further SAR studies of these analogs will provide valuable data.

Jarrett Mitton

Subject: Health, Nutrition & Clinical Sciences

The Relationship Between Diet Type and Nutrient Intake with Markers of Coronary Risk

Coronary heart disease (CHD) is a leading cause of death in the United States (US). The risk factors of CHD are well known and can be identified by serum lab markers, dietary and lifestyle choices, and various body measures. How the use of special diet types and general nutrient intakes are associated with these risk indicators is unclear. This study compares special diet types and macro- and micronutrient intakes with known levels of risk for CHD including triglyceride and low-density-lipoprotein cholesterol (LDL-C) levels and classifications. The study included 8,641 participants (18+ years) from the US National Health and Nutrition Examination Survey (NHANES) from 2011 to 2020. The use of a special diet, general nutrient intakes, body measures, and serum values of triglycerides and low-density-lipoprotein cholesterol (LDL-C) were examined. Linear regression was used to predict levels of triglycerides and LDL-C by diet type and nutrient intake after controlling for body measures including diabetic status, body mass index, and participant demographics. Compared to participants not following a special diet, participants who utilized weight loss or low-calorie diet were predicted to have lower triglyceride values (Beta= -6.4; 95% CI=-13, -0.15) whereas those on low-fat or low cholesterol diets were predicted to have higher triglyceride values (Beta=19; 95% CI=0.58, 38). Participants on a diabetic diet were predicted to have lower LDL-C values (Beta=-8.7; 95% CI=-16, -1.4) compared to participants not following a special diet. Specific nutrient intakes were not a significant predictor of triglyceride or LDL-C values. This study suggests that positive improvement in serum triglycerides and LDL-C values can be seen in individuals using weight loss and diabetic diet types respectively.

Patricia Morales Lorenzo and Juliette Bedard

Subject: Creative Works

Mapping Barriers to Entry of Spanish-Speaking Students in Forensic Anthropology: Diversity in Academic Opportunities at United States Hispanic-Serving Institutions

Diversity in research groups is widely recognized for its correlation with increased innovation and the broader impact of research findings. However, forensic anthropology presents a stark lack of diversity, with 87% of practitioners identifying as non-Hispanic White. This homogeneity may create blind spots in understanding the needs and challenges of the diverse communities served by the field. While efforts to address inequities in the field have primarily focused on race and gender, language barriers remain overlooked. Without interrogating available data, the forensic sciences cannot fully understand or address barriers to diversity. The dearth of Spanish-language scholarship in forensic anthropology mirrors the lack of diversity within the field. As part of a broad study investigating the experiences of Spanish-speaking forensic anthropology students and practitioners, we utilized the Hispanic-Serving Institutions (HSI) database to create interactive maps. These maps highlight various resources available at HSI institutions, such as course availability, faculty mentors, and enrollment costs. Additionally, we conducted a comparative analysis with non-HSI institutions offering forensic anthropology programs. In conjunction

with the mapping project, we administered a Qualtrics survey approved by the International Review Board (IRB) Human Subject at Idaho State University. This survey, developed following training via CITI, aimed to assess the sense of belonging and discipline climate among Spanish-speaking or Hispanic students and practitioners in American forensic anthropology. Furthermore, our study reviewed access to English-based journals for publications authored by Spanish speakers, about Spanish-speaking locations, or written in Spanish. This analysis sheds light on potential language barriers and disparities in academic publishing accessibility. Through these methodologies, our study endeavors to provide comprehensive insights into the challenges faced by Spanish-speaking individuals in forensic anthropology and inform evidence-based strategies for promoting inclusivity within the field. Results pinpointing persistent barriers as well as suggestive inclusive strategies will be presented. after getting all the data

Tanner Morton

Subject: Humanities, Behavioral & Social Sciences

Public Support for and Trust in ISideWith.com: Examining Perceptions of the Global Leader in Voter Education

Since 2012, ISideWith.com has been providing American voters with an interactive educational platform that allows potential voters the opportunity to see which candidates hold views that mirror their own beliefs on a wide variety of issues. ISideWith has since expanded to provide this educational opportunity to voters in an additional 40 countries. In the United States, ISideWith has been used more than 56 million times since 2012, making it one of the most used voter education platforms. Despite this reach, the literature has largely ignored ISideWith.com, with the exception of a few academic studies that utilize data collected by ISideWith. This project examines support for and trust in voter education platforms such as ISideWith.com. Original public opinion analysis suggests that ISideWith is generally viewed positively, but there are clear partisan and ideology differences that potentially limit the ability of ISideWith to educate voters. I utilize public opinion data taken from an original convenience sample survey of 191 students across multiple college and university campuses in the United States. Participants came from large and small public universities, private universities, and community colleges. This survey was created and distributed the Fall semester of 2021. This study sought to provide an understanding of what causes an individual to trust or use ISideWith.com. By connecting news media consumption patterns to a deep wealth of cognitive bias literature and news media effects, my data has identified numerous predictors which support my hypothesis that cognitive bias has an influence on individuals' interactions with voting education platforms; specifically, ISideWith.com. My research supports the impact of cognitive biases and news media effects on trust and support in voter education platforms, such as ISideWith.com.

Tanzim Mostafa

Subject: Engineering, Physical & Mathematical Sciences

Occluded Object Detection for Autonomous Vehicles Employing YOLOv5, YOLOX, and Faster R-CNN

Autonomous vehicles (AVs) represent the future of transportation, promising safer and more efficient journeys. However, achieving full autonomy requires advancements in accurate and swift environmental perception. Detecting and classifying objects in the vehicle's surroundings is essential. This research focuses on occluded object detection, crucial for enhancing AVs' perception. We introduce a new dataset featuring occluded instances of road scenes from Bangladesh, aiming to improve AVs' object detection capabilities. We employed transfer learning to train YOLOv5, YOLOX, and Faster R-CNN models using pre-trained weights from the COCO dataset. The dataset comprised 4,476 images of occluded objects from Bangladesh road scenes. Evaluation metrics included mean Average Precision (mAP) at 0.5 and mAP at 0.5:0.95. In our test set, YOLOv5 achieved an mAP at 0.5 of 77.7% and mAP at 0.5:0.95 of 54.6%. YOLOX

outperformed with mAP at 0.5 of 84.9% and mAP at 0.5:0.95 of 63.4%. Faster R-CNN achieved an mAP at 0.5 of 68.8% and mAP at 0.5:0.95 of 42.2%. YOLOX demonstrated superior performance on our dataset, highlighting its effectiveness for occluded object detection in AV environments. This study delves into occluded object detection, critical for AVs' environmental perception. YOLOX emerged as the top-performing model, showcasing mAP scores of 84.9% and 63.4% at 0.5 and 0.5:0.95 thresholds, respectively. While these results are promising, further improvements are possible with a larger dataset. Future work will focus on dataset expansion, exploring model fusion techniques, and leveraging vision transformers. Additionally, a federated approach holds potential, allowing vehicles and roadside units to communicate and enhance occluded object detection for AVs.

Tanzim Mostafa

Subject: Engineering, Physical & Mathematical Sciences

Short-Term Load Forecasting Employing Recurrent Neural Networks

This research delves into the domain of Short-Term Load Forecasting (STLF) using Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU) models. Focused on the west region of the Electric Reliability Council of Texas (ERCOT), the study utilizes a dataset spanning 2012-2015, enriched with new features such as day of the month, month of the year, and a detailed holiday classification. By employing meticulous hyperparameter tuning, the study aims to optimize LSTM and GRU models for improved load forecasting accuracy. The study employs a comprehensive dataset including hourly temperature, humidity, time of day, day of the week, and hourly load values, alongside the added features mentioned earlier. LSTM and GRU models are optimized through hyperparameter tuning, with varying architectures and look-back windows explored for each model. After rigorous evaluation, the LSTM model with an optimal architecture of four layers (40, 40, 40, and 80 neurons) and a dense output layer achieved impressive results. The identified optimal look-back window of 14 resulted in Mean Absolute Error (MAE), Root Mean Square Error (RMSE), and Mean Absolute Percentage Error (MAPE) values of 8.49, 11.78, and 0.77, respectively. Similarly, the GRU model, with an architecture of six layers (50 neurons for the first five layers and 30 neurons for the sixth), achieved competitive performance with MAE, RMSE, and MAPE values of 9.64, 13.10, and 0.86, respectively. In conclusion, this research significantly improves STLF accuracy for the west region of ERCOT through the application of LSTM and GRU models. By incorporating new features and fine-tuning model architectures, the LSTM model outperforms other models, demonstrating the potential of deep learning techniques in load forecasting. Future work will focus on implementing model fusion techniques to further enhance forecasting performance.

Morgan Musquez, Brianna Prien, and Erin Rasmussen

Subject: Humanities, Behavioral & Social Sciences

Effects of High-Sugar Diets on Delay Discounting for Food in Binge-Eating Prone and Binge-Eating Resistant Rats

Those with binge-eating disorder (BED) often consume high-fat, high-sugar foods during a binge-eating episode. Sugar bingeing appears to be especially important in the establishment and maintenance of BED. Delay discounting (DD)—a preference for smaller, more immediate rewards over larger, delayed rewards—is also implicated in BED. Therefore, we examined the extent to which diets higher in sugar influenced DD in binge-eating prone (BEP) and binge-eating resistant (BER) rats. Female Sprague Dawley rats (N=32) were used as subjects. Across four feeding sessions in which standard chow and Oreo® cookies were concurrently available, rats that reliably consumed the highest and lowest number of calories from Oreo were classified as BEP (n=16) and BER (n=16), respectively. Rats were then exposed to either a standard chow-only diet (8 BER and 8 BEP) or an Oreo diet plus standard chow (8 BER and 8 BEP). For the latter diet, rats were provided with equal amounts of standard chow and Oreo. Food DD was then determined by

presenting rats with choices between smaller, immediate food outcomes (one sucrose pellet immediately available) versus larger, delayed food outcomes (three sucrose pellets available after a systematically increasing delay). There was no effect of diet on food DD between BER groups. However, BEP rats given the Oreo-plus-chow diet had significantly lower discounting than BEP rats given the chow-only diet. These findings are the first to suggest that limited but consistent access to sugar may serve as a protective factor that decreases food DD for BEP organisms, lending support for flexible dieting rather than restrictive dieting for these individuals. More research is necessary.

Md Masud Un Nabi

Subject: Humanities, Behavioral & Social Sciences

Navigating the Online and Offline Challenges of Community Journalists in the Digital Age

Journalists face a lot of challenges while covering the news all over the world (Silva et al., 2022). They face harassment, abuse, and hatred that affect their mental and emotional health. In recent times, journalists in the US have faced a lot of challenges both online and offline (Forman-Katz & Naseer, 2023). This study examined the online and offline challenges faced by journalists in the four intermountain states of the United States: Idaho, Utah, Wyoming, and Montana. There is a lack of research on the challenges faced by local journalists working in small, rural communities in the region. In this study we surveyed 100 local journalists and conducted 15 in-depth interviews to examine the online and offline challenges faced by rural community journalists in the United States. This study, Idaho State University's IRB approval FY2023-236, aimed to gather information from journalists in the four intermountain states of the United States. 100 adult journalists, 58 women, 41 men, and 1 Non-binary/third gender consented to participate in the study. Participants were asked 42 questions in a Qualtrics survey form, distributed via Email in October 2023. On average, participants spent 7 minutes completing the questionnaire. All responses were anonymous and no identifiable information was collected. After the survey, journalists were requested for a follow-up, in-depth interview. In all, 15 journalists, 8 men and 7 women, agreed to take part in in-depth interviews. The participants in the interviews were five from Idaho, four from Utah, two from Wyoming, and four from Montana. The interview data was collected and transcribed by the first week of December 2023. On their perceived feeling of safety in the field, 48% of the participants said that they felt hesitant before covering a story, but 91% said that they have never refused to cover a story due to safety concerns. 6% of the participants said that they were stopped from covering a story due to safety concerns. 34% said that they felt unsafe going to a story about breaking news events alone. While most of the respondents (98%) never reported physical injuries in the field, 32% of the participants said that they have been mentally/emotionally harmed while covering a news story. On social media and journalism, 19% of the participants reported that social media criticism/hateful comments made them more fearful to cover stories. On whether they have taken any safety precautions on social media platforms to keep themselves safe, 18% of the participants responded yes. 67% of the participants found comments on social media platforms about their work are negative. 81% of the participants mentioned that they have received abusive messages on social media platforms. 37% of the participants said that they have been threatened while covering a story. 45% of the participants said they sometimes face hate, abuse, or criticism on social media, while 21% said they face harassment regularly. 50% of the participants said X (formerly known as Twitter) is the platform where they face the most abusive comments and criticism, while 43% said Facebook. 18% of the participants said social media criticism affects them personally, while 9% said social media criticisms and negative comments negatively affect their family members. 46% of the participants said X (formerly known as Twitter) is the platform where they receive the most positive comments, while 35% said Instagram. Out of the 100 respondents that participated in this study, 14% of the participants considered quitting the profession because of online harassment, while 11% considered quitting the profession because of offline harassment. We are currently analyzing the qualitative and quantitative data. However, in this study, our findings so far suggest that journalists face discrimination, mistreatment, lack

of organizational support, and hostility on a regular basis, which negatively affects their mental and emotional health. Regardless of the challenges, most journalists are resilient and do not want to quit the profession.

Costain Nachuma, Md Fazle Rabbi, and Arifa Islam Champa

Subject: Engineering, Physical & Mathematical Sciences

Insights into the Use of ChatGPT in Programming

ChatGPT has revolutionized the landscape of artificial intelligence (AI), evolving from its origins as a sophisticated text generator to a multifaceted digital assistant. Its broad utility spans a multitude of domains, from enhancing customer service interactions to fostering innovation in creative industries. A notable area where ChatGPT has become essential is in the realm of programming. It offers support in a variety of programming languages, each with its unique syntax and paradigms, demonstrating the model's adaptability and technical prowess. Our current research delves into the ways in which developers leverage ChatGPT's assistance, aiming to decode their preferences and the frequency of its use across different programming languages, thereby shedding light on the advancing relationship between AI tools and modern software development. In our study, we leveraged the DevGPT dataset, identified by the release tag '20230914', to examine the interaction between developers and ChatGPT, focusing on programming languages and the assistance provided by ChatGPT. This dataset, composed in JSON format, compiles extensive data from diverse platforms such as hacker news posts, GitHub issues, pull requests, commits, source files, and discussions, providing a rich foundation for our analysis. We found that ChatGPT assists with a wide range of programming languages, notably Python, Bash, and JavaScript, which together accounted for over 40% of developer inquiries. We observed that simpler queries related to data manipulation languages like SQL required fewer interactions, while more complex languages such as C++ demanded more extensive dialogue. Our study demonstrates ChatGPT's broad assistance in programming, with the top sought after languages being Python, Bash, and JavaScript, which constitute over 40% of inquiries. It highlights ChatGPT's efficiency in handling simpler data manipulation languages like SQL with fewer interactions, in contrast to the more complex requirements for languages like C++ and C#. These findings suggest avenues for enhancing AI tools to better support developers, especially with complex queries. Future research aims to refine AI-developer collaboration through both qualitative and quantitative methods, enhancing the effectiveness of AI in software development.

Christopher Nicolet and Dong Xu

Subject: Biological & Natural Sciences

Constructing the 3-Dimensional Structure of the Mechanoelectrical Transduction Channel

The process of hearing involves the conversion of vibrational sound waves into electrical signals through specialized hair cells located in the organ of Corti of the inner ear. These hair cells contain actin-rich bundles of stereocilia arranged in a staircase fashion connected by tip links composed of cadherin 23 (CDH23) and protocadherin 15 (PCDH15). Positive deflection applies tension to mechanically gated transduction (MET) channels, creating an open state that permits the inward flow of cations that effectively depolarizes the hair cell. Depolarization causes the subsequent release of neurotransmitters that relay auditory information to the central nervous system. Essential protein subunits that constitute the MET channel include the transmembrane channel-like proteins 1/2 (TMC1/2), transmembrane inner ear protein (TMIE), and calcium integrin binding (CIB2) proteins. Together these structures have gained considerable attention as viable targets to clarify mechanisms of auditory perception and drug-induced ototoxicity. The recent structural characterization of the *C. elegans* TMC1 channel has provided an ideal template for generating homology models of TMC proteins expressed in mammalian systems. With support from the

BPSCI Computational Core Facility, we have constructed multiple components of the MET channel expressed in humans, mice, and zebrafish utilizing the Maestro Schrodinger Suite software program. Each structure has been prepared for molecular dynamic simulation to explore different conformational states, perform molecular docking experiments, and discover potential otoprotective compounds that block the MET channel.

Anyaubu Nmaju, Emily Price, Ella Marvoski, and Sarah Hobdey

Subject: Health, Nutrition & Clinical Sciences

A High Throughput Method of Streptolysin O Antibody-Epitope Mapping by Random Mutagenesis

Group A Streptococcus (GAS) precipitated Necrotizing Soft Tissue Infections (NSTIs) are deadly bacterial infections for which tissue debridement, including amputation, is the only life-saving treatment. Streptolysin O (SLO), a cholesterol-dependent cytolysin, is one of the major toxins responsible for the progression of this infection and a promising therapeutic target for this disease state. Our research is focused on developing immunotherapies that can neutralize this toxin and improve clinical outcomes. We developed three fully human, anti-SLO monoclonal antibodies (huMAbs) with high affinity and specificity. While all three huMAbs show similar levels of SLO inhibition in vitro, only one huMAb provides significant protection in a murine model of GAS-NSTI. This project aims to identify the specific huMAb-SLO binding sites by developing an all-new epitope mapping approach. In this study, a recombinant SLO mutant library was created by random mutagenesis. Mutants were screened for huMAb binding by ELISA. The mutants that altered binding were sequenced and mapped onto the 3D structure of SLO to visualize possible epitopes. Guided point mutations and ELISAs were used to confirm all epitope residues and how their mutations affect the equilibrium dissociation constant (KD). Currently, a library of over 2,500 SLO mutants has been generated and screened, and over 150 unique mutants altered huMAb binding. SLO activity assays suggested that introducing 1-2 mutations per molecule was less destabilizing to the protein structure and thus, provided more reliable data for mapping. For huMAbs that prevent SLO membrane binding, epitope hotspots were concentrated in domain 4, SLO's membrane binding domain. For neutralizing huMAbs that do not prevent membrane binding, hotspot residues were clustered around domains required for oligomerization or insertion. In future studies, we will use the epitope data to build 3D simulations of the huMAb-SLO interaction while simultaneously evaluating the role of each epitope in SLO pore formation. This study presents a novel method for epitope mapping and provides insight into the mechanism of SLO inhibition by each huMAb, which can guide future bioengineering efforts to enhance antibody-antigen interactions.

Yashodha Nyaupane

Subject: Engineering, Physical & Mathematical Sciences

Potential of PCC-RCC Concrete Tetrapod in Mitigating Near-shore Ocean Acidification

Increasing atmospheric CO₂ is believed to be the cause of global climate change, evidenced not only by rising temperatures but also by rising sea levels and extreme weather events. Ocean water near the coast tends to be more acidic due to coastal upwelling, in which ocean currents bring more acidic water from deeper in the ocean to the surface harming marine life. A tetrapod is a structure generally made of concrete, designed to dissipate wave energy and effectively utilized to protect coastlines from erosion. A major drawback in its use lies in significant carbon emissions during the cement production process. Recent research indicates that employing Precipitated Calcium Carbonate (PCC) combined with Upcycled Recycled Concrete Aggregate (RCA) can provide structural strength similar to conventional cement concrete. Hence, the use of PCC-RCA concrete for manufacturing tetrapod reduces a considerable amount of CO₂ emissions into the atmosphere. Our research attempts to address the question: Would PCC-RCA

concrete tetrapod help in mitigating near-shore ocean acidification? The main objective of this study is to demonstrate that PCC-RCA concrete can buffer pH changes caused by increasing acidity in ocean water. This study consists of two phases. Phase I involves the calibration of the chemical speciation equilibrium model - visual MINTQ and in Phase II of the study, the validity of the visual MINTQ model prediction will be assessed by carrying out a series of experiments using PCC-RCA concrete and simulated ocean water. As of today, the model has been calibrated, and the results of the model calibration show that the pH of ocean water decreases as atmospheric CO₂ increases and that the placement of PCC-RCA concrete in ocean water can decrease the acidity created by increasing CO₂ in the atmosphere. It is hoped that the tetrapod manufactured using PCC-RCA concrete become green infrastructure for environmental conservation.

Kendal Olson, Carlyn Osterhout, Raiden Hunter, Mikaela Sapafford, Lauren Jager, Samjhana Pradhan, Courtney Jenkins and Joshua Pak

Subject: Engineering, Physical & Mathematical Sciences

Synthesis of Condensation Polymer Model Compounds for Degradation Studies

Plastics have become an indispensable material in modern society. They are cheap, durable, light in weight and easy to manufacture into a variety of products. The use of plastic is burgeoning and the current disposal methods are not sufficient for managing the resulting waste. A number of techniques such as recycling, incineration, chemical degradation and landfill have been implemented to reduce the environmental impact of plastic waste. Nonetheless these techniques are energy intensive, expensive, or impractical. There is still a need for alternative techniques that are cost-effective, clean and energy efficient. In this regard, the use of ionizing radiation such as gamma-ray serves as a possible technique for plastic waste management by degrading the polymer into useful materials. Herein, we aim to explore the use of gamma radiation for the deconstruction of condensation polymers. For this, we have strategically synthesized a series of model compounds that have structural resemblance to common condensation polymers produced today. Specifically, we focused on constructing low molecular weight amides, urea, urethanes, carbonates and esters by following the conventional condensation reactions. These compounds were obtained in good yields by reacting either alcohols or amines with corresponding chloroformates, acid chlorides and carbamoyl chlorides. The synthesized compounds were characterized via ¹H NMR, ¹³C NMR, GC-MS and LC-MS techniques and subsequently, irradiated with gamma-ray to investigate the mechanistic aspects of condensation polymer degradation.

Jordan Oman, Pooja Sapkota, Seyedeh Melika, Angela Hayden, Marvin Schulte and Srinath Pashikanti

Subject: Biological & Natural Sciences

Synthesis of Vitamin C Analogs as Novel Hearing Loss Therapeutics

Hearing is important for physical, mental and social well-being but, more and more people are at risk of developing noise-related hearing loss due to occupational hazards. However, there is no cure for noise-related hearing loss. Recently, receptors found within the inner ear have been identified as possible targets for hearing loss therapy. Vitamin C is an antioxidant, critical cofactor, and free radical scavenger that is important in many biological processes, it has also been shown to potentiate α₉α₁₀ nicotinic receptors located in the inner ear. My research focuses on the synthesis of novel pharmaceuticals utilizing natural products that can protect against noise through the activation of noise-induced feedback mechanisms. Vitamin C is a natural product that will be utilized to create a library of compounds. Vitamin C contains an enolic hydroxy core that is amenable to many functional group transformation. A library of Vitamin C analogs will be synthesized to perform classical structure-activity relationship (SAR) studies to help determine the mechanism of action on the receptor. Chiral pool strategy is utilized towards

enantioselective synthesis of analogs from L-ascorbic acid's poly-hydroxylated scaffold. Enantioselective methodologies of chiral aminobutenolides will be utilized in related analogs of ascorbic acid. A small library of compounds was synthesized for initial testing of Vitamin C analogs. These analogs and purchased compounds similar to Vitamin C were used for initial SAR studies on $\alpha 9\alpha 10$ nicotinic receptors. Initial results from Vitamin C analogs are promising for the development of a novel therapeutic for hearing loss. Screenings led to finding a new lead molecule that can be used to develop novel compounds for the receptor and the important functional groups of Vitamin C for activity. Development of more compounds for this receptor is important to understand its role in hearing and as a target for hearing loss therapies.

John Opeifa

Subject: Humanities, Behavioral & Social Sciences

Muammar Gaddafi and the United States of Africa: The Unfulfilled Vision

This paper critically examines Muammar Gaddafi's ambitious vision of the United States of Africa and the intricate factors that ultimately led to its demise. The analysis commences with a comprehensive exploration of Gaddafi's biography, focusing on his synthesis of Arab socialism, Pan-Africanism, intellectual legacy and revolutionary principles that laid the foundation for his expansive vision. This paper further explores the impact of Pan-Africanism shedding light on their role in fostering African unity and providing insights into the intricate dynamics of continental solidarity. A crucial aspect of the study involves the examination of Libya's oil economy, which played a pivotal role in supporting Gaddafi's Pan-African initiatives. Additionally, the research dissects Gaddafi's proposal for a gold dinar currency, strategically positioned to challenge the dominance of the U.S. dollar. In conducting the analysis of Muammar Gaddafi's vision of the United States of Africa, a mixed-method approach was employed, combining literature review, biographical analysis, economic assessment and geopolitical examination to comprehensively explore the various dimensions of the subject matter. This study meticulously addresses the challenges posed by continental differences, spanning culture, language, governance, and historical experiences, offering a nuanced understanding of the multifaceted hurdles that hindered Gaddafi's vision. This research contributes to a deeper comprehension of the historical context and complex dynamics that shaped Gaddafi's endeavor, underscoring the intricacies involved in the pursuit of African unity and self-reliance. In conclusion, the examination of Muammar Gaddafi's vision of the United States of Africa reveals a complex interplay of ideological, economic, and geopolitical factors that ultimately led to its demise. Despite Gaddafi's fervent efforts, opposition from Western powers, challenges inherent in continental diversity, and economic constraints undermined the realization of his Pan-African dream. This study underscores the importance of understanding historical contexts and the intricate dynamics of power in shaping continental initiatives.

Carlyn Osterhout, Kendal Olson, Raiden Hunter, Mikaela Spafford, Lauren Jager, Samjhana Pradhan, Courtney Jenkins, and Joshua Pak

Subject: Engineering, Physical & Mathematical Sciences

Degradation Study of Condensation Polymer Model Compounds by Gamma Radiation

Polymers are ubiquitous in our everyday life. Unfortunately, most of these polymers end up persisting in the environment or taking up space in landfills instead of being recycled. These end-of-life polymers create a range of environmental and health complications. Due to the excessive amount of polymer waste production, a significant portion of valuable resources and energy are wasted for polymer degradation techniques. Understanding how these polymers degrade and their transformation into new products can offer insight into reutilization of resources and energy embedded in end-of-life polymers while reducing negative consequences. In order to gain a better understanding of how polymers degrade, we synthesized model compounds that resemble widely-used common condensation polymers. Herein, we subjected these

model compounds to varying dosages of gamma radiation. Upon irradiation, the samples were evaluated for degradation patterns by GC-MS to understand the effects of reaction conditions in bond-cleavage pathways. In cases of CH₂Cl₂ as solvent used in the experiment, radical species from CH₂Cl₂ acted as secondary reactant on the model compounds to give rise to a range of new products. We found that model compounds containing urea functional groups were most susceptible to generate degradation products with the least amount of gamma radiation. Whereas model compounds containing functional groups such as amides, urethanes, esters and carbonates, required higher doses of gamma radiation with complex product mixtures. Future work for this project will include studying different solvent systems along with catalysts such as acids and zeolites.

Alexis Packer

Subject: Health, Nutrition & Clinical Sciences

The Effects of Spirituality and Religiosity on Body Image

Social media usage continues to rise among teens and young adults since it was first invented. Body image continues to be a concern as a negative body image can lead to engaging in less health practices and poor health outcomes. Our study uses snowball sampling to identify a secure attachment to God, consistent religious practice is a protective factor to body image concern. Our survey was conducted among young adults who are members of the Church of Jesus Christ of Latter-Day Saints.

Md Fazle Rabbi, Arifa Islam Champa, Costain Nachuma, and Minhaz Zibran

Subject: Engineering, Physical & Mathematical Sciences

A Comparative Analysis of Automated SBOM Tools for Open-Source JavaScript Projects

The generation of accurate Software Bills of Materials (SBOM) is crucial for software supply chain security but faces challenges due to complex software dependencies. The effectiveness of tools designed for automating SBOM generation, particularly for JavaScript projects, remains understudied. We evaluate four SBOM generation tools (ORT, cnn, syft, cdxgen) using 50 open-source JavaScript npm projects to assess their capability in identifying software components and dependencies accurately. Our analysis reveals significant performance differences among the tools, especially in their ability to detect dependencies, indicating varied effectiveness in their approaches to SBOM generation. This study provides insights into selecting SBOM generation tools, highlighting the importance of understanding tool capabilities to enhance software supply chain security and transparency.

Md Fazle Rabbi, Arifa Islam Champa, and Minhaz Zibran

Subject: Engineering, Physical & Mathematical Sciences

Insights into AI-Generated Python Code: Quality and Security Analysis

We aim to understand differences in quality between code generated solely by ChatGPT and code modified from user-provided samples, crucial for assessing risks in integrating AI-generated code into software systems. This study examines the quality and security of

AI-written Python code, focusing on 1,756 snippets from the DevGPT dataset. We quantitatively analyze these code snippets, categorizing them as ChatGPT-generated or ChatGPT-modified, and utilize established metrics for quality and security assessment. The analysis reveals significant disparities in the quality of ChatGPT-generated versus ChatGPT-modified code, with the latter exhibiting a higher incidence of quality issues. These findings underscore the need for caution and scrutiny when integrating AI-written code into software projects, particularly when modifications to user-provided code are involved. The study highlights

the limitations of AI-written code and emphasizes the importance of careful evaluation before integrating such code into software projects.

Makenzie Reed, Beverly Victoria Bolivar, Anna Jirik, and Devaleena Pradhan

Subject: Biological & Natural Sciences

Dorsal fin raises as low intensity aggressive displays during hierarchy resolution in a sexually plastic fish

Aggression between conspecifics largely influences mating success and social status in animals. The range of these behaviors are variable, falling on a continuum including behaviors in which an individual “displays” themselves on one end and where individuals may physically contact each other on the other. Traditionally, the size-advantage model is the approach to determine the winner of an aggressive encounter. However, recent observations have shown that size may not be the only factor in determining social status and outcomes of aggression. In this study, we examined the role of non-contact aggression displays involving morphological characteristics. The bluebanded goby, *Lythrypnus dalli*, is a social, bidirectional sex changing fish that performs many aggressive displays. One of these is the dorsal fin raise (DFR), where a fish raises its dorsal fin from a relaxed position (flat on the dorsal side) to an erect position. To measure the use of this behavior during hierarchy resolution, two males and one female were placed in a novel social group to trigger one male to transition into a female. During the early phase of hierarchy resolution (Days 1, 3, and 5), we recorded the frequency and duration of each DFR. Further, we investigated whether the DFR was directed to another fish or a broadcast display. There was no significant difference in the duration and frequency of DFRs among the three fish. However, we found that DFR performance was variable, such that was performed as fast as 0.05 seconds or as long as 400 seconds. Preliminary findings indicate that males, or the individual that won the dominant social status within a group, performed more fin raises for a shorter duration. Understanding the consequences of the DFR will untangle the relationships of multimodal communication and the effect of visual aggression displays during hierarchy resolution.

Makenzie Reed, Deeksha Seth, and Devaleena Pradhan

Subject: Biological & Natural Sciences

Future of Fin Filmography: A novel system to record and analyze fin movements

Parental care quality and quantity is critical for reproductive success. The bluebanded goby, *Lythrypnus dalli*, is a harem marine fish that exhibits male parental care. This species has two prominent parental care behaviors: fanning using fins and rubbing by moving the body in multiple orientations. While this behavior has been documented and investigated previously, the precise mechanisms of fin movement and body orientation have not been described biomechanically. Limitations are largely due to the difficulty of creating an environment permissive to repeatable recordings. To overcome this issue, we worked with senior mechanical engineering students at Villanova University to design and construct an apparatus that would allow for this work. In addition to make the recording repeatable, students also built an apparatus that took other aspects of my planned research into account, including maneuverability, camera positioning, and lighting. Finally, these students constructed a new, 3D printed nest tube, which the fish will be provided to perform parental care. This customized tube features a square design for the entrance, with a removeable side to increase viewing and lighting inside it. This will help overcome problems such as including arc math and lighting associated with the previous circular nest tube. Once the apparatus arrives at ISU this spring, testing of the apparatus function in these key areas will begin. This will include ensuring that the apparatus can be moved from tank to tank in a repeatable way, and that the fish performs parental care in a square versus circle nest tube. This apparatus will be used in my dissertation research,

establishing L. dalli as a novel system to unravel the mechanisms by which hormones and morphology affect performance of behavior. By understanding the underlying mechanisms driving movement, we can untangle how minute changes in behavior alter critical downstream effects, such as reproductive success.

Blair Richlin

Subject: Health, Nutrition & Clinical Sciences

Demographics Affecting Access to Hearing Technology: Insights from NHANES

About 16% of adults in the United States over the age of 18 have difficulty hearing with 85% of adults with hearing difficulties who may have unmet hearing healthcare needs. Unfulfilled access to hearing testing is associated with lack of access to health care. There may be an association with healthcare literacy; health-related information is often written above average U.S. adult reading levels. This study explores the factors that potentially impact access to hearing technology. Data from NHANES 2017-2020 was used to study hearing technology usage in a sample of 1,380 US adults aged 70 and older. Logistic regression was used to predict hearing technology usage by participant education, insurance, and demographics. A total of 1,380 participants aged 70 and older were included in this study (mean age = 76). For every one year increase in age, the odds of using hearing technology increased by 16% ($p < 0.001$). Males had higher odds of using hearing technology compared to females (OR = 1.72; $p < 0.001$). Compared to non-Hispanic White participants, the odds of using hearing technology was lower for non-Hispanic Black participants (OR = 0.29; $p < 0.001$) and other Hispanic participants (OR = 0.33; $p = 0.012$). Compared to participants with private insurance, participants with Medicare also had decreased odds of using hearing technology (OR = 0.68; $p = 0.013$). No statistically significant differences occurred in the odds of using hearing technology with different levels of educational attainment. These findings suggest that age, gender, and race/ethnicity may be important considerations when designing interventions to improve access to hearing technology among older adults. Further research is needed to better understand the reasons for the lack of an effect of educational attainment and to identify additional factors that may influence hearing technology usage in this population.

Tali Rotman and Curtis Billings

Subject: Health, Nutrition & Clinical Sciences

Age and Hearing Effects on Cognition and Speech-in-Noise Recognition

Age-related hearing loss is commonly identified as the primary factor contributing to the difficulties encountered by older adults in understanding speech in background noise when compared to young adults. Nevertheless, the variability in speech recognition capabilities in noisy environments among older and younger listeners exceeds predictions based solely on their pure-tone audiometric thresholds. Research suggests that various cognitive functions, including executive functions and working memory, significantly contribute to explaining this variability. Thus, the objective of the present study was to determine the relationship between different cognitive tasks and speech-in-noise recognition as a function of age and hearing loss. In line with the findings from previous studies, our hypothesis posited that a stronger correlation between cognition, especially working memory, and speech-in-noise recognition would manifest in both ONH and OHI groups compared to YNH. Additionally, we expected this correlation to be particularly heightened in the OHI group compared to the ONH group. Three groups of participants were enrolled in the study: young adults with normal hearing (YNH) ($n = 8$; age = 20-37 years), older adults with normal hearing (ONH) ($n = 9$; age = 62-77 years), and older adults with hearing impairment (OHI) ($n = 10$; age = 60-78 years). Cognition was tested using the Digit Span Forward & Backward, Stroop, and Trail Making Test – Part B. Speech-in-noise recognition abilities were tested using the QuickSIN and the Listening in Spatialized Noise-Sentences test (LiSN-S). The Digit Span serves as a widely employed indicator of working memory capacity, while the Stroop and Trail Making Test are both assessments of diverse

executive functions such as selective attention, processing speed, and cognitive flexibility. As expected, the YNH group performed significantly better than the OHI group for both speech-in-noise tests. In addition, ONH participants generally performed better than OHI participants. Main effects of group on cognitive tests were also found with YNH participants generally performing better than older groups. However, contrary to our expectations, a significant correlation between the Digit Span score and QuickSIN test performance was observed solely within the YNH group. Results from this study generally support our current understanding of the effects of age and hearing loss on cognition and hearing: that cognition and speech recognition in noise decline with age. However, significant correlations between cognition and recognition only for the YNH group suggest that cognition's role in speech-in-noise recognition may be heavily dependent on the specific tests used.

Pooja Sapkota, S. Melika Akaberi, Sabina Yeasmin, Jordan Oman, Shrinath Pashikanti, and Marvin Schulte

Subject: Health, Nutrition & Clinical Sciences

Discovery of Positive Allosteric Modulators (PAMS) of $\alpha 9/\alpha 10$ nicotinic acetylcholine receptors for the treatment of hearing loss.

At present, more than 1.5 billion people live with hearing loss and the Global burden of disease expects this number to surpass 2.45 billion people by 2050. To address this problem at the molecular level, scientists have identified $\alpha 9/\alpha 10$ nAChRs as a major target. The $\alpha 9/\alpha 10$ nAChRs are the hair cell receptors, present only in the outer hair cells of the inner ear. They form a part of the Medial olivocochlear efferent pathway playing an important role in mediating synaptic transmission between efferent olivocochlear fibers and outer hair cells. At this point, where there are no approved therapeutics for the treatment of hearing loss, we aim to discover first-in-class therapy for the treatment of pathologies related to the auditory system and study the mechanism of receptor potentiation as well as binding kinetics. We will use the electrophysiological technique to express $\alpha 9/\alpha 10$ nAChRs in *Xenopus laevis* oocytes for functional assay, and study binding kinetics using Surface Plasmon Resonance. The test compound and analogs, synthesized by our medicinal collaborator, will be scanned for their allosteric modulating effect on $\alpha 9/\alpha 10$ nAChRs. The existing PAMS of other nicotinic receptors like $\alpha 7$ and $\alpha 4\beta 2$ will also be evaluated for potentiation of $\alpha 9/\alpha 10$ nAChRs. Following the lead compound Ascorbic acid, identified earlier by other labs, known to potentiate the $\alpha 9/\alpha 10$ nAChRs, we tested analogs of ascorbic acid and out of those, one analog was found to have a better potency than Ascorbic acid. This analog is a better potentiator than ascorbic acid itself. It emerges as a novel candidate for drug development and subsequent clinical trials aimed at treating hearing loss. (Note: The name of analog has been withheld for confidentiality reasons)

Emma Shiflet and Heather Ramsdell

Subject: Health, Nutrition & Clinical Sciences

Self-Efficacy in College Students with Dyslexia: A Survey Study

Dyslexia is considered the most prevalent neuro-cognitive disorder and is estimated to affect about 20% of the population (The Yale Center for Dyslexia & Creativity, n.d.). The International Dyslexia Association (n.d.) defines dyslexia as a disorder characterized by difficulties with decoding, word recognition, spelling, and fluent word reading skills. The difficulties individuals with dyslexia experience can impact higher education and vocational performance. Academic difficulties experienced by children with dyslexia can impact self perception of their abilities. The purpose of this study is to investigate the impact of the life-long difficulties individuals with dyslexia experience on their self-efficacy. An online Qualtrics survey was sent to a sample of college students in the mountain west region through publicly accessible email addresses (faculty at universities) and Decoding Dyslexia chapters. Recipients of the email were encouraged to forward the survey to undergraduates. The survey questions explored perceived self-efficacy, perceptions

of success, factors that impact self-efficacy, and general experiences of individuals with dyslexia . Descriptive statistics (frequencies and percentages) were calculated to describe demographics and response rates. Fisher's exact tests and Cramer's V, with a standard alpha of 0.05, were completed to explore the relationship between student classification as with versus without dyslexia and demographics, perceived self-efficacy, perception of success, and factors that impact self-efficacy. It was expected that results would show a correlation between difficulties related to dyslexia and inferior self-efficacy. There was no statistical significance in perceived self-efficacy between those with versus without dyslexia. However, there were many differences in the ways students reported learning across groups. This research can be used to create or adapt treatment approaches for dyslexia which incorporate methods to increase self-efficacy and educate younger school-age children on strategies to employ for success throughout academic and professional careers. Clinical implications, study limitations, and future directions will be discussed.

Ainsley Snyder and Mya Vanderpool

Subject: Biological & Natural Sciences

Thiolate ligand effects on behavior of molecular precursors for earth abundant semiconducting nanomaterials

Research into new designs of photovoltaic technologies has become prominent in an effort to find less toxic and expensive metal centers that will still provide similar characteristics to the current CuInS₂ and CuGaS₂ semiconductors. One promising candidate is Cu₂ZnSnS₄ (CZTS) whose individual metals are all relatively earth-abundant and safe. Pathways into this research have thus far focused on synthesizing CZTS through direct methods, which has been unsuccessful due to the stoichiometry being difficult to measure exactly. However, another method of synthesis is through the development of molecular precursors that allow for the delivery of at least two elements from one molecule, which can offer improved control over the material's composition, phase, and particle size. The specific precursors can be designed utilizing a variety of thiols which might affect the intermediates that are formed during the synthesis reaction. Copper and zinc thiolate complexes have been synthesized and characterized to support this strategy. These complexes have been studied to determine the effects of the thiolate ligand on properties such as decomposition reactivity and solubility. These investigations have focused on the role of chelating dithiolate ligands that were previously found to play key roles in related precursor systems and have included characterization of both complexes and their decomposition reactions by techniques including ¹H NMR and TGA-DSC. Over a dozen copper thiolate complexes were synthesized through an exchange reaction mechanism, which was favored by the bulkiness and volatility of the starting material. For the complexes with multidentate thiols, two binding modes were predicted and monitored by TGA traces. The mass loss associated with the pure monoanionic thiolate was not observed even when using excess thiol, indicating that bridging is the favored binding mode. The TGA traces for the monothiolate complexes show only one decomposition event, whereas the dithiolate complexes exhibit multiple distinct steps.

Sara Sourani Yancheshmeh

Subject: Engineering, Physical & Mathematical Sciences

A Smart Autonomous Ground Vehicle with the Ability to Adapt Its Size to Environments

The identified challenge pertains to the traversal of small obstacles and uneven surfaces encountered by an Autonomous Ground Vehicle (AGV). The proposed solution involves the design and implementation of a versatile AGV equipped with a dynamic size-changing mechanism. This innovative system integrates a four-wheel-drive vehicle with a modifiable chassis capable of adjusting both height and length [1]. The AGV will operate in a low-height mode during normal conditions, seamlessly transitioning to a high-height mode

upon detecting obstacles [2]. The primary objective is to enhance the vehicle's adaptability, allowing it to navigate through diverse terrains by intelligently adjusting its physical dimensions in response to environmental cues. This adaptive feature aims to optimize the AGV's performance, ensuring efficient and obstacle-free mobility in various operational scenarios. In the initial phase of project advancement, the focus is directed towards chassis optimization, employing the Finite Element Method (FEM) in conjunction with MATLAB for coding implementation [3]. The meticulous application of FEM enables a thorough exploration of structural configurations, facilitating the identification of optimal weight considerations for the chassis. Subsequently, the evaluation process extends to SOLIDWORKS, where the designated chassis model undergoes a comprehensive stress analysis. This critical step serves to validate the accuracy of the results obtained through FEM and MATLAB. The SOLIDWORKS platform is instrumental in simulating real-world conditions, enabling a meticulous examination of the chassis's ability to withstand the actual load. The stress analysis component scrutinizes various points on the chassis to pinpoint areas of heightened stress and deformations. 1. The initial design is developed based on an optimization method in MATLAB and all stress analysis tests have been done in a simulated environment (SolidWorks). 2. During this project, we initiated collaboration with the Department of Civil Engineering to improve the design of this vehicle and achieve the maximum strength-to-weight ratio for its chassis. We plan to make the chassis with a 3D printer using carbon fiber. For this purpose, a large 3D printer with a printing volume of 1010mm x 1010mm x 1010mm was purchased and assembled last summer. 3. Two conference papers related to this work are currently in preparation and will be submitted to the i-ETC Conference in Utah (IEEE).

Brittany Stalzer, Eliana Claps, Lauren Elmore, and Joshua Swift

Subject: Education, Learning & Training

Financial Distress and Suicide Among Clinical and Counseling Graduate Students

Suicide is a prominent cause of mortality among young adults, including young adults within university populations. Among the various stressors university populations face, financial strain and debt have been shown to be significant risk factors for suicide attempts. Members of this specific population encounter distress related to student loan debt and low income, factors that have demonstrated a substantial and adverse association with suicide within the 20–34 age group. Despite extensive research on undergraduate and graduate students, there is a scarcity of studies specifically investigating these factors within clinical and counseling doctoral students. Members of this population not only encounter financial stress related to student loan debt and low income but are also uniquely exposed to suicide through their professional activities. Such conditions are subsequently linked to an elevated risk of suicide ideation. The present study seeks to explore the relationship between financial distress (i.e., perceived financial stress and financial anxiety) and suicidal ideation among clinical and counseling doctoral students, as well as how this relationship is moderated by perceived program support and mediated by hopelessness. Participants were recruited across all APA-accredited clinical and counseling psychology doctoral programs and were asked questions about their graduate school and clinical experiences, as well as questions regarding their finances, financial stress, perceived program support, and ratings of hopelessness. A total of 238 responses met the criteria for inclusion by passing attention check questions. This study is a secondary data analysis of another research project that was funded by the DeCou Family Endowment for Suicide Prevention. Preliminary results suggest significant model interaction for both moderation and mediation. Results from this study may have important implications for how we conceptualize and understand financial stressors and support systems in the context of suicidal behavior among future clinicians.

Olivia Stanley

Subject: Engineering, Physical & Mathematical Sciences

Frozen fountains: Rock glaciers as cold-water reservoirs in semi-arid mountain ranges

The meltwaters of annual snowpack and mountain glaciers have long been recognized as vital contributors to semi-arid, high mountain water budgets. However, as climate change continues to result in widespread glacial retreat and variable snowpack, these meltwaters are expected to play a diminishing role in alpine water budgets. Rock glaciers are common features within semi-arid, mountainous landscapes that constitute a relatively overlooked hydrologic resource. Understanding the hydrologic significance of rock glaciers including flow patterns and the biogeochemical characteristics of the meltwaters is necessary for informing effective water resource management and conservation efforts through the coming century. This study seeks to contribute to the limited body of rock glacier hydrology research by developing a regional inventory of rock glaciers and characterizing the diverse hydrology, isotope geochemistry, and ecological significance of rock glacier meltwater streams in the central Idaho mountains. Given the increasing stress on alpine freshwater resources amidst changing climactic conditions, this study's findings could inform sustainable water management strategies, highlighting the role of rock glaciers as natural reservoirs with the potential to supplement water supplies for energy (hydropower) and agricultural needs during critical low-flow periods. By additionally examining the ecological implications of rock glacier meltwater streams, this research also contributes to a broader understanding of how these unique hydrological systems support biodiversity and niche ecosystem services in dry, mountainous landscapes.

Katie Stubbers and Shannon Lynch

Subject: Humanities, Behavioral & Social Sciences

Best practices for trauma-focused research with women in corrections settings

Women in corrections settings report high rates of trauma exposure prior to their incarceration. Previous research on pathways to incarceration points to trauma exposure as a contributing factor for subsequent incarceration, highlighting the need for investigation of exposure to trauma and trauma symptoms in this population. Conducting trauma-focused research with women in corrections settings has specific benefits for participants and those in their communities through identifying targets for treatment and program intervention. Such research requires careful consideration of ethics to protect this vulnerable population while maximizing the benefit from the research. Investigations of women's experiences of participating in trauma-focused research suggests that despite the field's concerns for re-traumatization to occur, most women do not report negative experiences and even report positive outcomes from their participation when ethical protocols are implemented. Best practices for conducting trauma-focused research with currently incarcerated women will be presented.

Rifat Ara Tasnim

Subject: Education, Learning & Training

Designing a Serious Game for CBT and The Influence of Personality Traits on Gameplay Experience

Cognitive Behavioral Therapy (CBT) is one of the leading psychotherapeutic interventions practiced by significant numbers of mental health professionals. CBT is successful in treating known mental disorders such as anxiety, depression, phobias, and many others efficaciously. We have developed a serious game *Militant of the Maze (MoM)*, accessible via handheld devices that comprises a persuasive strategy of CBT - Finding alternatives. We hypothesized that perseverance of the ability of 'alternation' can notably improve treating patients dealing with Obsessive Compulsive Disorder (OCD). We also hypothesized that a player's gameplay experience can be significantly impacted by the player's personality traits. We developed "MoM", a third-person maze game, where the primary goal is to find a possible way out. While finding the way out, the players will have to confront multiple hindrances which symbolize the difficulties when trying to achieve a goal. The game signifies the impact of 'finding alternatives' by providing alternative actions as minigames when players fail to do any task. Each participant played two versions of the game - one

without alternative actions (noAlt) and another with alternative actions (Alt) to overcome challenges. After each gameplay players' positive and negative affect were measured using PANAS and their personality traits were identified using BFI questionnaire. An experiment was conducted on 150 participants. The statistical analysis demonstrated that players encountered more positive experience while playing the Alt version and noAlt version had more negative impact. We also found that Alt version has significantly more positive and less negative affect on players with Agreeableness or Conscientiousness as major personality trait. Whereas, Alt version has significantly less negative affect on players with Neuroticism personality with no distinctive difference in positive affect. Although the overall effect of the gameplay in Alt version demonstrated higher positive impact, variation in PX was observed based on the players' personality traits.

Soni Thapa

Subject: Biological & Natural Sciences

Ecophysiology of thermophilic endospores in deep sea hydrocarbon seep sediments.

Endospore-forming thermophilic bacteria (thermospores) have been repeatedly detected in permanently cold marine environments that do not favor their metabolic activity. Identifying the source of these thermospores in cold marine sediments can reveal dispersal mechanisms of microbes that influence sub-surface microbial diversity. Upward seabed fluid flow originating from subseafloor oil reservoirs could be a potential source for delivering viable thermophilic bacteria to the cold ocean floor. Marine hydrocarbon seep sediments were collected by piston coring from several locations in the Eastern Gulf of Mexico. From each location, anoxic sediment slurries in triplicate were prepared by combining sediments with artificial seawater medium amended with volatile fatty acids (VFAs) and 20 mM sulfate. Slurries representing each location were pasteurized at 80 ° C for one hour, and subsequently incubated at 35 ° C, 50 ° C, and 65 ° C for 28 days. At regular intervals, microbial activity was examined by monitoring sulfate depletion and concentrations of VFAs. Microbial community composition at different subsampling intervals was determined by high-throughput 16S rRNA gene amplicon sequencing on an Illumina Miseq platform. At higher temperatures, sulfate reduction and fermentation occurred to a greater extent in sediments associated with hydrocarbon seepage. At 65°C, microbial activity was prominent only in the seep locations. 16S rRNA gene amplicon libraries revealed an elevated relative abundance of sequence reads affiliated with Firmicutes lineages in all incubations where microbial activity was observed. At 35°C, Clostridia and Bacilli were detected at all locations, with Clostridia representing the larger fraction of the community. On the contrary, certain thermophilic Clostridia and Bacilli were exclusive to seep locations at 65°C. Metagenome sequencing to better understand these organisms may reveal the genetic potential for living in sub-seafloor petroleum reservoirs, which would be consistent with a dispersal history of deep-to-shallow transport out of oil reservoirs via hydrocarbon seeps.

Jenn Tyler

Subject: Health, Nutrition & Clinical Sciences

Canine Audiology: What is Normal?

Within the subject of auditory evoked potentials, there is ample normative data for humans, however, there is a need for more when it comes to canines. Many canines of all ages get tested using brainstem auditory evoked potentials (BAER) to establish if the dog has hearing and is fit for work or if they are deaf and other arrangements need to be made. The dogs that come into our clinic are mainly for breeding and show dogs, however, there are other uses for canines that are able to hear appropriately. These jobs can include but are not limited to service dogs for those who are hard of hearing or deaf, guide dogs for those who are blind, and K-9 police dogs. Testing canines can be difficult. With normative data, it will be easier to identify the waveforms to determine normal hearing. The purpose of this study was to collect data from brainstem auditory evoked response (BAER) testing on canines using a broadband click stimulus at a high intensity to

establish normative data for different breeds of canines. During appointments, at least two audiologists and an audiology graduate student were present. Depending on the size of the dog they were either held by resting on the holder's forearm and away from the holder's body or gently restrained in a lounging position. Subdermal electrodes were placed behind the ears and on the forehead. There was tenting of the skin to ensure accurate placement and to avoid animal discomfort. The forehead electrode was the non-inverting electrode, the test ear electrode was the non-inverting electrode, and the non-test ear electrode was the ground. The stimulus was delivered using either standard or pediatric insert earphones, depending on the canine's ear size, and they were placed deeply in the external auditory canal. Testing was conducted using the Bio-Logic auditory evoked response system. Wave V was replicated and marked to determine the latency for both ears. A report was written following the testing. Normal hearing or hearing loss was determined based on the presence or absence of wave V in each ear. Results were printed, signed by the audiologist, and given to the breeder. The data was saved in the software. Later the data was collected and organized into an Excel spreadsheet based on breed. Statistical analysis was then completed using Prism software. Initially, the study included 434 canines or 868 ears. However, due to no response, age, or large outliers, certain ears and canines had to be eliminated. The resulting number of canines was 418 or 815 ears. Table 2 indicates the number of participants per breed. Latencies were obtained, compared, and averaged in categories according to breed. (More to come). To be done.

James Wardell

Subject: Humanities, Behavioral & Social Sciences

The Risk Reflection: How Fears of AI Translate into Ban Advocacy of Generative Artificial Intelligence

This study explores the relationship between perceived risks of Artificial Intelligence (AI) and the desire to regulate or ban Generative Artificial Intelligence (GenAI) in academic and workplace settings. We utilize a public opinion survey to analyze attitudes towards GenAI, focusing on ethical considerations and potential regulations (at the federal and international level). Key findings indicate that risks associated with AI, such as the belief it may take over the world or is more trouble than worth, significantly influence the desire for regulation and the banning of AI in both academic and workplace environments. Further highlighting the need for informed discussions on GenAI integration into society, and emphasizing the importance of context, communication, and power dynamics in shaping its future. This study illuminates the crucial role of context, communication, risk, and power dynamics in shaping the integration and future of GenAI in society.

Sarah Wilensky

Subject: Health, Nutrition & Clinical Sciences

Investigation into a Strength & Conditioning Needs Analysis

This Master's Project is an investigation into a Needs Analysis for collegiate Volleyball, Baseball, and Soccer to prepare a young strength coach for working with these teams. This Master's Project is simply a compilation of research (peer reviewed, journal articles, blogs, social media, fellow coaches, textbooks, etc) to create a needs analysis and highlight different needs of the three chosen sports. The presentation will include a powerpoint/poster and oral presentation. The project itself will be put together in a website format so that I can attach it as a link to my resume or as supplementary information for job applications. The research is still in progress, but upon presentation describe the components of a needs analysis and go through the stark differences and important findings for each sport.

Jessica Woolley

Subject: Education, Learning & Training

A Mindful Pedagogical Approach to the Maternal in 20th-Century Postcolonial Fiction”

“Boring”, “uninteresting”, “unlikeable characters”: these are some of the many adjectives used by members of the public in their Rotten Tomatoes reviews of the 2021 movie, *The Lost Daughter*. An adaptation of Elena Ferrante's 2006 novel, *The Lost Daughter* captures the protagonist's ambivalent relationship with motherhood while vacationing in Greece where she is reluctantly reminded of her past abandonment of her two daughters. The movie's depictions of Leda's struggles with juggling motherhood alongside her career, and later, abandonment of her daughters, fails to ignite any compassion or understanding among viewers. Instead, viewers are critical and dismissive of Leda. Many of the reviews echo a disdain for Leda's mothering skills and in so doing, critique the movie's overarching theme of maternal abandonment—a topic that has long been considered taboo across many cultures and countries. Expectations of mothers and depictions of the maternal resound not just in movies, but literary texts, too. In this paper, I argue the importance of focusing on the maternal in a contemporary postcolonial literature course and adopting a feminist and mindful self-compassion pedagogical lens. Considering the maternal in postcolonial novels is vital because of how the postcolonial context highlights the interactions between the maternal and the nation; postcolonial contexts show how critical depictions of maternity are to a nation and how a nation is perceived, while at the same time, revealing the contrast between a nation's depiction of motherhood and mothers' lived experiences. Adopting a feminist and MSC lens, instructors can create a safe and supportive space to not only discuss literary depictions of the maternal, but encourage compassion and understanding. As Barbezat and Bush note, contemplation, a form of mindfulness, “reveal[s] our inextricable connection to each other, opening the heart and mind to true community, deeper insight, sustainable living, and a more just society” (xv).

Doctor of Pharmacy and Health Resident Abstracts

Zachary Cochran, Sarah Lee, Cara Liday, and Renee Robinson

Subject: Health, Nutrition & Clinical Sciences

Patient's Attitudes Towards Artificial Intelligence in Healthcare Technology: A Scoping Review

Advancements in artificial intelligence (AI) and machine learning (ML) present unprecedented opportunities to revolutionize healthcare technology. While there is great excitement surrounding such advancements, there are also safety and ethical concerns, especially for patients. To better understand patient perspectives on AI/ML-enabled devices, a scoping review was conducted. The objective of the review was to articulate patient attitudes and preferences on AI/ML in health devices. This scoping review systematically surveyed multiple databases spanning from 2009, employing targeted search queries related to patient attitudes, AI/ML, health, and pertinent study designs. We included English-written articles that represented original research, included patients' attitudes and preferences on AI, and discussed technology that could be considered to use AI/ML in health devices. We leveraged Covidence (covidence.org) for meticulous organization and execution of the review process, including citation/full-text screening and data extraction. We screened 7,835 citations and 236 full-text articles, with 46 articles ultimately included. Our scoping review of pertinent literature regarding patients' attitudes and preferences toward AI/ML in medical devices identified key themes including provider oversight, concerns about depersonalization, data privacy and security, transparency in algorithmic decision-making, and apprehensions surrounding bias and fairness. This synthesis illuminates critical insights essential for informing the ethical and practical integration of AI/ML technologies in health devices, thus paving the way for a more patient-centered and ethically grounded approach to technological innovation in healthcare.

Madeline Foster, John Holmes, and Jordan Ferro

Subject: Health, Nutrition & Clinical Sciences

Addressing Barriers to Naloxone Prescribing: Investigating the Impact of Educational Interventions on Naloxone Prescribing in a Federally Qualified Healthcare Center

Naloxone is a safe, effective antidote for opioid-induced respiratory depression that is easy to use and often lifesaving in the event of opioid overdose. This therapy is of significant utility in the hands of prepared bystanders, who can drastically shorten the time to opioid reversal and connection to emergency care. Despite these benefits, naloxone remains inaccessible to many patients. A previous anonymous survey distributed to family physicians, nurse practitioners, and physician assistants at Idaho State University's Department of Family Medicine determined that the primary barriers to naloxone prescribing were a lack of time in office visits, lack of workflow reminders, and a need for educational resources. The objective of this quality improvement project is to implement interventions to address each primary barrier to naloxone prescribing and determine the effect on frequency of naloxone prescribing and on provider comfort with and perceived barriers to naloxone prescribing. Patient-directed educational resources (handouts and conversation starter posters) were placed in exam rooms at Health West ISU. Provider-directed educational trainings and resources included one in-person naloxone training, one online naloxone training, and periodic educational emails sent to providers. Frequency of naloxone prescribing was assessed pre-intervention and at monthly intervals between June 2023 and February 2024. The anonymous survey used to assess provider comfort with and perceived barriers to naloxone prescribing will be repeated post-intervention. This quality improvement project is currently in-progress. The survey will be distributed in February 2024. Preliminary results will be presented.

J. Andrew Hopkins, Eric Sievers, Erin Berry, Rachel Lopez, and Eliza Borzadek

Subject: Health, Nutrition & Clinical Sciences

Safety and Efficacy of Implementing a Low-Dose Amoxicillin Challenge Protocol to Rule Out Inaccurately Reported Penicillin Allergies in the Inpatient Setting

About 20% of hospitalized patients report a penicillin allergy; however, fewer than 5% of these patients are truly allergic to penicillins. These falsely labeled penicillin allergies contribute to negative health and cost outcomes, such as increased mortality, prolonged length of hospitalization, and extended duration of antibiotic therapy. Additionally, they negatively impact antimicrobial stewardship, fostering the development of antibiotic-resistant infections. PEN-FAST is an internationally validated scoring system used to determine one's risk of having a positive reaction to a penicillin allergy test. This simple, four-question assessment may enable the healthcare team to efficiently de-label patients with inaccurately reported penicillin allergies, thus allowing for more appropriate utilization of antibiotics. The objective of this quality improvement project is to determine if the implementation of a low-dose amoxicillin challenge protocol provides a safe and effective process for removing inaccurate penicillin allergies from the medical record and improves antibiotic prescribing in a hospital setting. A PEN-FAST score is completed on all admitted adult patients who have a listed penicillin allergy, are prescribed antibiotics, and are able to take medications via the enteral route. Those with a PEN-FAST score less than three are consented to receive a one-time dose of amoxicillin 250 mg orally. If no adverse reactions are noted within 60 minutes, the penicillin allergy is removed from their chart and, if needed, antibiotic therapy is optimized. The primary study outcome is the proportion of patients whose penicillin allergy was removed from their medical charts. Secondary outcomes include incidence of adverse events and the proportion of patients whose therapy was either changed to a β -lactam or deescalated to a narrower-spectrum β -lactam within 24 hours of the amoxicillin challenge. Outcome analyses will include all those who had a PEN-FAST score completed and will be stratified by participation vs. non-participation in the low-dose amoxicillin challenge.

Harrison Hoskins

Subject: Health, Nutrition & Clinical Sciences

Enhancing Inpatient Blood Glucose Control: A Collaborative Approach

Patients with poorly controlled blood glucose levels during hospitalization face increased risks, including prolonged length of stay, higher rates of infection, and worse clinical outcomes. Addressing glycemic variability in hospitalized patients is crucial for optimizing care and reducing healthcare costs. The intervention will be conducted at Portneuf Medical Center, involving adult hospitalized patients across various wards and departments. The participants include multidisciplinary healthcare professionals such as diabetes education nurses, inpatient pharmacists, and advanced practice providers. The inpatient blood glucose control team will collaborate to develop and implement personalized glycemic management plans for eligible patients. Interventions may include medication optimization, patient education, and close monitoring of blood glucose levels. The team will work closely with patients and other healthcare providers to ensure comprehensive glycemic control throughout the hospital stay. The data collection phase is currently in progress, with main outcome measures including rates of hypoglycemic and hyperglycemic episodes, length of hospital stay, infection rates, and overall clinical outcomes. These measures will be used to evaluate the effectiveness of the intervention in improving glycemic control and patient outcomes.

Sofia Manczurowsky, Sierra Condie, Lindsey Reeder, Rachel Lopez, Eliza Borzadek, and Erin Berry

Subject: Health, Nutrition & Clinical Sciences

Implementation of a hypertonic saline bolus and infusion protocol for the management of patients with or at risk for elevated intracranial pressure and cerebral edema in the adult intensive care unit at a trauma center

Adult patients in the intensive care unit (ICU) with various neurologic injuries often require hyperosmolar therapy to prevent or manage elevated intracranial pressure (ICP) and cerebral edema in order to mitigate serious complications. Hypertonic saline (HTS) in concentrations ranging from 3% to 23.4% sodium chloride (NaCl) is preferred over mannitol due to better efficacy and fewer side effects; however, there is still debate in the literature regarding optimal administration. Common strategies utilize bolus dosing of 3% to 23.4% NaCl and/or continuous infusions of 3% NaCl. HTS is a high-risk medication requiring careful monitoring and administration to prevent patient harm. This single-center, retrospective, quality improvement project aims to create a standardized HTS bolus and infusion policy for use in the adult ICU to manage patients with or at risk for elevated ICP and cerebral edema by answering the question: does implementation of a standardized HTS policy improve time to goal sodium range? Patients \geq 18 years old admitted to the ICU with or at risk of elevated ICP who have HTS ordered for ICP management will be eligible for inclusion. A goal sodium range will be selected by the ordering provider. A baseline serum sodium will be obtained and then monitored every 4 hours during HTS therapy. The primary outcomes are time to goal sodium range and time in goal sodium range. Secondary outcomes include time to first dose of HTS, time with CPP \geq 60 mmHg and reduction in ICP. Data will be collected retrospectively. This quality improvement project received an exempt status from the Institutional Review Board. In progress. This research is currently in progress. Post-implementation data collection began February 1, 2024. Results and conclusions will be available pending completion of the study.

Zachary Nelson, Bo Dayton, Rylan Anderson, Tyler Kunz, Ryan Hudgens, Travis Nielsen, Blaine Olsen, James Marble, Andy Thaine, and Sulabha Chaganaboyana

Subject: Health, Nutrition & Clinical Sciences

Assess and address Lifestyle Medicine awareness in marginalized populations

Health disparities and chronic disease are significantly more prevalent among medically underserved communities. This creates a financial burden to the patient and to the medical community. Lifestyle medicine uses evidence-based medicine and application of its 6 pillars to help prevent, treat and when used intensively can reverse chronic health conditions. Our goal is to better assess and address lifestyle medicine in the medically underserved/ marginalized population. Surveys via paper and QR codes were distributed in English and Spanish at two separate clinics (Healthwest ISU, and Intermountain health). Only English forms were filled out in the end. Surveys were available and gathered for 103 days and were imputed into a google survey form. The survey consisted of mostly multiple choice questions and a few options for open ended short answer questions. We have 185 completed surveys. Of those surveys the ages were 6-17 (3.2%), 18-39 (35.1%), 40-65 (34.6%), and above 65 (27%). 69.2% were women and 29.2% were male and 1.6% were non-binary. Of the participants 83.8% were white, 16.2 were non white. On a scale of 1-5, 5 being very confident on their knowledge of what it means to have a healthy lifestyle most responded with 3 (40.5%) and 4 (37.8%). For the short answer of what it means to live a healthy lifestyle most responded with answers similar in kind to healthy eating and exercising. Our information that we gathered showed us that while a quarter of the survey participants felt that they already were living a healthy lifestyle, many felt more information would help them make improvements in their life. Some of

what was felt would help them live a healthier lifestyle was attending a cooking class, receiving educational handouts or having a meeting with lifestyle medicine physicians. We feel that there is a lot of information that if shared with the medically underserved population could significantly improve the health and lives of those in an at risk population.

Baily Stark, Sarah Kershisnik, and Heather Gagliano

Subject: Health, Nutrition & Clinical Sciences

Mobile-Offsite-Special COVID-19 Vaccination Clinics for Communities

Disproportionately Affected by COVID-19 - Focus on Community Partnerships

The Mobile-Offsite-Special COVID-19 Vaccination Clinics for Communities Disproportionately Affected by COVID-19 is a project promoting community health in underserved populations in Idaho. One area of focus has been a collaborative effort between the Consulate of Mexico in Boise, Idaho State University College of Pharmacy, and the Idaho Immunization Coalition. The work at this clinic aims to address healthcare disparities and improve access to essential services among Mexican and Latino communities in the Northwest region. Through a combination of vaccinations and health screenings, the clinic's mission is to provide preventive care measures and empower individuals to take proactive steps toward better health outcomes. Vaccines offered by our clinic include COVID-19, influenza, and other ACIP-recommended adult immunizations. The clinic seeks to foster a culture of health literacy by engaging with community members in meaningful dialogue and education. This is accomplished by leveraging culturally competent approaches and bilingual staff to ensure that language and cultural barriers do not impede individuals' access to vital healthcare resources. The comprehensive preventive health screenings and services include blood pressure checks, cholesterol screenings, and diabetes assessments at no cost to the patients. By mitigating risk factors associated with chronic diseases we are able to promote wellness within the community. Through preventive care and lifestyle education, participants are able to make informed decisions about their health and adopt healthier behaviors. In 2023, we educated a total of 2495 patients, administered 841 total vaccines, and provided 1329 preventative health screenings at the Mexican Consulate clinics. In conclusion, the vaccination and health screening clinics at the Mexican Consulate in Boise represent an innovative, unique initiative in advancing public health and community well-being in an underserved population. It has successfully promoted health within the community, utilizing a culturally competent approach towards comprehensive services.

Undergraduate Abstracts

Aisley Allen, Gisselle Trejo, Ninahazwe Mireill, Alexander Thomas, Trenton Shappee, Phoenix Larsen, Madalyne Sisk, Daniel Puentes Navarro, and Madison Renn

Subject: Biological & Natural Sciences

Rowlf's Enzymatic Experiment: Unique Bean Enzyme Found in Novel Bacteriophage

The primary objective of this research was to isolate a novel bacteriophage from soil and annotate the genome to determine gene functions. Microbacterium foliorum cluster EG phage Rowlf was collected outside Idaho State University's Gale Life Science building. It was isolated, purified and amplified; a transmission electron micrograph (TEM) was generated; and DNA was extracted and characterized. Standard isolation techniques were performed to extract the phage from the soil. Purification and amplification allowed for phage concentration to increase for subsequent analyses. The phage genome was sequenced by the Pittsburgh Bacteriophage Institute using an Illumina MiSeq sequencer. The ISU phage biology team annotated and characterized the genome using an array of bioinformatics tools, including BLAST, HHpred, GeneMark, Glimmer, Starterator, Phamerator, TmHm, and other standard tools. Using these tools, the team identified Rowlf putative genes and, for many of the putative genes, assigned functions. The team found that Rowlf has approximately 105 genes. The TEM revealed characteristics of siphovirus morphology, a long-tailed phage with fibrous appendages. Notably, one of Rowlf's genes shares sequence similarity with purple acid phosphatase (PAP), a gene typically observed in leguminous plants. In plants, PAP is used in growth and repair, as well as pathogen defense against bacteria. PAP is also observed in bacteria, which use it to prevent damage caused by oxygen reactivity. However, its role in the phage remains unknown. Only cluster EK phages are known to also have PAPs.

Lizbeth Arellano Santoyo, Leticia Herrera, Alleyna Martes, and Michele Brumley

Subject: Biological & Natural Sciences

Walk This Way: Weight-Bearing Locomotion Comparison After a Spinal Cord Injury in Neonatal Rats

This study aims to compare weight-bearing locomotion in an open field with dynamic weight-bearing activity (DWB) on a dynamic weight-bearing system from the company Bioseb. On postnatal day 1 (P1), subjects will undergo either a low-thoracic spinal cord transection, cutting the communication between the brain and the lower spinal cord, or a sham transection. Each subject will be tested at different developmental stages (P5, P7, P10, P12, P15, and P21) using a dynamic weight-bearing system and at four select ages (P5, P15, P15, and P21) using an open-field test. Our lab is collaborating with the company by assisting in the pilot study and providing information to refine the DWB system for the use of smaller animals. We will also compare our results from both methods to examine how the DWB Bioseb system maps functional weight-bearing locomotion. Results will help us better understand the plasticity of the spinal cord and possibly be applicable to human research.

**Shae Calixtro, Aurora Lamm, Rebecca Bridges, Nikki Gundacker,
Yvette Pham, Vikki Hanson, and Chris Michael**

Subject: Humanities, Behavioral & Social Sciences

Supporting Birth: The Role of Continuous Midwife Care in Low-Risk Pregnancies

The United States exhibits the highest maternal mortality rate among high-income countries across all ethnic groups. Addressing poor health outcomes in low-risk pregnant women is imperative to reduce this disparity. The PICOT question investigated during this literature review: "In low-risk pregnant women, does the provision of continuous midwife support during labor, compared to standard care without such support, lead to reduced labor duration, improved maternal satisfaction and better neonatal outcomes during the labor and delivery period?". The literature review focused on randomized controlled trials involving primiparous women, comparing continuous midwife support to standard care during labor. Findings from the reviewed studies indicated significant benefits of continuous midwife support, including shorter active labor duration, lower cortisol levels during labor stages, higher rates of spontaneous delivery, and reduced postpartum hemorrhaging. Maternal satisfaction levels and neonatal outcomes were improved compared to traditional care methods. Despite limitations such as small sample sizes and a focus on primiparous subjects, the literature review illustrates the potential of continuous midwife support to improve maternal and neonatal health outcomes during labor and delivery. In summary, these findings suggest a promising avenue for improved maternal health outcomes, emphasizing the importance of integrating continuous midwife support into standard care protocols.

Ellie Cameron, Makenzie Peterson, and Xiaomeng Xu

Subject: Humanities, Behavioral & Social Sciences

**Mentorship Matters: Wisdom and Insights from a Qualitative Analysis of the
PsychSessions Podcast Mentoring Series**

The Teacher Behavior Checklist (Buskist et al., 2002) has been highly influential and useful for teachers of psychology, establishing 28 teacher qualities and behaviors and providing a valuable tool for assessment and reflection. No such resource currently exists for mentors, although mentoring is highly impactful for students, teachers, and other psychology professionals. As a first step in this programmatic line of research, we launched a series in the summer of 2022 on mentoring as part of the PsychSessions podcast (Conversations about Teaching N' Stuff). Interview guests are in higher education with ties to psychology and for our first set of interviews these guests have had extensive experience with mentoring. While the direction of the conversation shifts from interview to interview, we have been guided by a set of possible questions and points of discussion which include what mentoring is and isn't, why mentoring is important, what makes for effective mentoring, how we can make mentoring more inclusive, and advice on how to make the most of mentoring relationships. We conducted qualitative data analysis of the semi-structured interviews to determine themes. The main themes that emerged were achieving goals, growth, relational considerations, and important mentoring traits. This was the first step in a multi-stage project. The results of this project will be used in a later project to develop a mentor behavior checklist modeled after the Teaching Behavior Checklist.

**Brittanie Cornelsen, Anthony Kulp, Maria Stoddard, and Ashley
Bakes**

Subject: Health, Nutrition & Clinical Sciences

Effect of SID on EI Number

Intro: Every day patients are exposed with ionizing radiation. Radiographers producing the radiation are responsible for radiation safety for themselves and their patients.¹ The three cardinal rules of radiation

safety are time, distance, and shielding. If the time cannot be zero during an exposure, distance is the best way to reduce radiation exposure.² This should be true for source image receptor distance (SID) as well. Hypothesis: The further the distance is from the image receptor, the lower the image receptor exposure number when all other factors remain constant. Materials and Methods: In this experiment several exposures were performed tabletop on the same 14"x17" image receptor with similar technical factors, completely open collimation, and varying distances using a ceiling-mounted CareStream 3DRX-1 x-ray machine. The technical factors used were 70 kVp, 3.60 mAs, no grid, no AEC, a small focal spot size, and an AP shoulder tag. After each exposure the tube was raised 5 inches and the image receptor number was recorded. Results: The results, as seen in Figure 3, show the further the SID, the lower the IR exposure number. Which proved the original hypothesis to be correct. For patients and radiologic technologists, the further the distance from the tube, the less exposure received. Conclusion: The experiment results seen in Figure 3 coincide with the literature.^{1,3,4} The researchers Lakhwani and Pancholy are using SID and skin to surface dose as measuring parameters.^{1,3} These share a similar point in the closer the patient or tech is to the x-ray tube at the time of exposure, the higher the dose. The Papp explains the importance of the Inverse Square Law, stating radiation intensity is inversely proportional to the square of the distance. The authors Mekiš and Watts mainly focus on image quality and spatial resolution.^{2,4} With the increase in SID the image spatial resolution increases and dose decreases.⁵

Aubree Denker

Subject: Biological & Natural Sciences

Adapting to the Heights: Insights into Altitude Acclimation and Cardiac Function

Introduction: High-altitude acclimation involves complex physiological and molecular adaptations enabling humans to survive and perform in environments with reduced oxygen availability. This review explores the intricate mechanisms underlying these adaptations, focusing on their impact on cardiac function and overall physiological changes. High-altitude exposure poses significant challenges, including hypoxia and cold stress, which can precipitate acute mountain sickness and long-term health effects. Understanding these mechanisms is crucial for improving health outcomes and performance in high-altitude environments. Project Description: This literature review synthesizes current research on high-altitude acclimation, highlighting key pathways and genes involved in hypoxic response, erythropoiesis, angiogenesis, and metabolic adaptation. It delves into the role of hypoxia-inducible factors (HIFs) in orchestrating cellular responses to low oxygen, adaptations in cardiac metabolism, and shifts in energy production strategies. The review also examines the physiological changes in cardiac function, including alterations in heart rate, stroke volume, and blood pressure, as adaptations to ensure adequate oxygen delivery to tissues. Lessons Learned: Research indicates that genetic factors play a significant role in high-altitude adaptation, with certain populations exhibiting unique genetic traits that enhance their tolerance to hypoxia. These adaptations include increased red blood cell production, improved oxygen uptake and transport, and enhanced mitochondrial efficiency. Additionally, acclimatization processes contribute to the optimization of cardiac output and vascular function, crucial for maintaining homeostasis in low-oxygen environments. Recommendations for Future Professionals: Further investigation is needed to elucidate the genetic basis of high-altitude tolerance and the potential for these adaptations to inform medical treatments for cardiovascular and respiratory diseases. Research should also explore the long-term effects of high-altitude exposure on cardiac health and the effectiveness of acclimatization strategies. Conclusion: Understanding the mechanisms of high-altitude acclimation and its impact on cardiac function opens new avenues for enhancing human performance and health in hypoxic environments. This review underscores the importance of integrated physiological and molecular approaches to address the challenges posed by high altitude, aiming to improve the well-being and operational efficiency of individuals in these extreme conditions.

Bronwyn Ellis

Subject: Biological & Natural Sciences

Investigating Thermophilic Endospores in Monterey Canyon

My project primarily focuses on analyzing the dormant microbial communities in sediments collected from various sites in Monterey Canyon. The sites selected correspond to cold seeps in the canyon. A cold seep is an area of the ocean floor identified by hydrocarbons escaping from below the seabed into the water column. This infusion of hydrocarbons into the local environment creates an abundance of life surrounding the cold seep (Joye, 2020). Cold seeps are also notable for allowing microbes that live in the hotter anoxic environment that feeds the seep to escape into the water column as well. These microbes cannot normally survive this change, but some are able to persist as endospores. We are aiming to analyze the dormant endospore community. We are aiming to analyze this dormant community and compare it to other dormant seep communities from around the world, starting with the Gulf of Mexico. For this project, I used molecular biology techniques such as DNA extraction, PCR, gel electrophoresis, and sulfate measurements to assess both the dormant communities in Monterey Canyon and the Gulf of Mexico. To do this, we had to make our dormant cells exit dormancy. This was accomplished by creating an artificial seawater environment under anoxic conditions and maintaining the culture in a heated anoxic environment for the course of a month, subsampling at regular intervals. We obtained sequencing data for 15 samples at 2 different time points. This allowed us to do community analysis to see what the common classes and genera in phylum Firmicutes were in our samples. We also did alpha and beta diversity analysis to see how related the Monterey Canyon samples were to one another and to the Gulf of Mexico samples.

McKenzie Gerdes, Kaylyn Buchanan, and Joseph Kepler

Subject: Engineering, Physical & Mathematical Sciences

Solar Panel Water Craft

Solar panels are one of the cheapest, most accessible forms of clean, renewable energy available to people worldwide. Their ability to efficiently convert solar power into electricity has helped to power homes, businesses, and cities on a global scale. Although solar panels' output relies on the weather, which is often unpredictable and is impossible to control, solar panels offer a great alternative to the non-renewable energy sources that contribute to the exponentially increasing climate crisis. Water surveying is an important task for the maintenance of aquatic ecosystems and habitats. The measurement and regulation of temperature and dissolved oxygen content ensures a healthy and balanced body of water. Fluctuating temperatures can be harmful to populations of aquatic life, killing off large amounts of aquatic. These characteristics cannot always be controlled, but it is common for wildlife specialists and water quality experts to aerate and agitate bodies of water if they fluctuate too much. This project aims to improve the way measurements of depth and dissolved oxygen content of a body of water are retrieved. Designing a watercraft that is remotely controlled, will improve accessibility for a body of water which will save time, resources, and manual labor for aquatic specialists. The watercraft will be designed to allow autonomous powering via an attached solar panel and battery that can last a minimum of 6 hours at a time. The travelling speed will be approximately 1-2 mph, while accurately navigating in any direction to take different measurements in time. The thermograph will be operated by a winch, which will be able to drop to predetermined depths up to 30ft by an automated mechanical system. The thermograph will be able to record and store data that can then be connected to a computer for further data analysis and dissolved oxygen monitoring.

Brooklynn Hammond

Subject: Biological & Natural Sciences

Exploring the Respiratory System

The respiratory system and all of its parts can be hard to understand and follow. The poster presented should aid in understanding the pathway of oxygen, carbon dioxide, and other important materials throughout the respiratory system, cardiovascular system, and their supporting structures. It is important to understand the form and function, the anatomy and physiology in these routes in the human body. Using printed images and drawings, I will aid the learned in the comprehension of the movement of imperative processes in gas exchange.

Brooklynn Hammond

Subject: Health, Nutrition & Clinical Sciences

Case Study: Myocardial Infarction caused by Paradoxical Coronary Artery Embolism in 19 year old, bringing attention to faults in the ER diagnostic system

Many physicians use common diagnostic procedures for cardiac testing, but how extensive does the emergency department test for a common complaint such as chest pain? This study, conducted by Emergency Medicine and Cardiology physicians in San Diego Medical Center, focuses on a rare case originating with a young patient complaining of chest pain reported to the ED. Throughout the study, the authors stress the importance of eliminating cardiac problems in an emergency situation. During this presentation, I will review this case study, the statistics of cardiac-related problems in young adults, the first line diagnostic checklist for emergency medicine professionals, and the basic anatomy and physiology of the heart. Using a slideshow to present images and graphs to further the understanding of the material, I can explain the common abnormalities seen on EKGs and their clinical representations.

Angela Hayden, Jose Tzompa, Savannah Call, and Ivy Marshall

Subject: Engineering, Physical & Mathematical Sciences

Zeolite Catalyzed Friedel-Crafts Acylations

Friedel-Crafts acylation reactions are traditionally catalyzed using a metal halide catalyst which acts as a Lewis acid. This process creates large amounts of toxic waste and is harmful to the environment. We have replaced the metal halide with various zeolites to make this process more sustainable. Zeolites are heterogeneous, aluminosilicate compounds with micropores ranging from 0.1 - 2.0 nm. They can be recycled and are safer to handle than the traditional metal halide catalysts. Our work thus far suggests that zeolite Y-hydrogen is the best catalyst for the acylation of m-xylene with benzoic acid to form 2,4-dimethylbenzophenone. Different silica to alumina ratios in Y-hydrogen zeolites, reflux time, drying agents, and nucleophile equivalences have also been explored. The substrate scope is beginning to be expanded with a variety of electron-donating and -withdrawing substituents on the nucleophile. Reactions with unprotected substrates and benzoic acid have produced low conversions thus far, so we have begun to study the effect of substrate protection on conversion. So far, the protecting group triisopropylsilane (TIPS) has been tested. Further refinement of procedures is needed to quantify the conversion and yield. Future work will consist of exploring more silyl ether protecting groups and electrophilic substrates with varying electron-donating and -withdrawing substituents.

Morgan Hess, Saige Meek, and Emory Hebdon

Subject: Health, Nutrition & Clinical Sciences

The Effects of Clothing Artifacts on Image Quality

An artifact is something caught on an image, such as patient-based artifact (motion artifacts) and clothing artifacts (jewelry).¹ To minimize artifacts, a radiographer must ask the patient to remove all radiopaque objects covering the area of interest and where necessary change them into the hospital gown during the imaging examination.² Repetition of radiographic images is a concern because it exposes patients to unnecessary ionizing radiation with a corresponding increase in radiation dose.² To understand how leaving certain clothing, such as buttons and patches, on during an x-ray can lead to artifact and effect the EI number. Using a digital radiography x-ray machine, we imaged an abdomen phantom, chest phantom, and foot phantom without any clothing on them (controlled variables). Then, we added various types of clothing with different material and artifacts to see what effect each had on the image. We used appropriate technique and collimation for each body part. After we took each image, we observed any artifact that might have been added and the effect it had on the EI. EI was recorded for each phantom with no clothing, and for each phantom with clothing. Artifacts on the images were recorded. The EI number was expected to increase with the clothing on the phantom. The artifacts in each clothing article was expected to show in the images. As seen from results: The EI number was more likely than not effected by the clothing articles (the shoe changed the EI number). Not all artifacts from clothing showed up in the images. As discussed: We found that the artifacts on clothing that you would expect to show up on the x-ray don't; but the artifacts you don't expect to show up will. We found that most tech's we have personally worked with won't change a patient wearing a button up shirt, which is not the correct approach because the buttons do show up. It is smart to change every patient with any kind of artifact in the area of interest.

James Heberlein

Subject: Biological & Natural Sciences

Nutrition and Its Role in Maintaining the Cardiovascular System.

The Cardiovascular system is one of the most prominent systems in our body as it is an essential way for the body to deliver nutrients and oxygen throughout the body. That means that diseases to this system can be dangerous. I wanted to do a literature review of how nutrition can help maintain the cardiovascular system and how improper diets can hurt the physiological aspect the cardiovascular system. Abstract Paragraph The cardiovascular system is an essential system in our body, which regulates pH, circulation, oxygen delivery, and transport nutrients. Cardiovascular disease refers to a group of disorders of the heart and blood vessels that include coronary heart disease, cerebrovascular disease, rheumatic heart disease, and other conditions. In the United States, one person dies every 33 seconds from cardiovascular disease, according to the Centers for Disease Control and Prevention. But is cardiovascular disease preventable? This research aims to review whether nutrition plays a prominent role in preventing heart disease and summarize the mechanisms behind the protective effect of diet. This research found that a poor nutritional diet leads to a higher risk of developing cardiovascular disease, while proper nutrition can lead to less risk of developing cardiovascular disease. Although dietary interventions have been proposed as a solid strategy to prevent cardiovascular disease, overall nutrition, specific nutrients, foods, and nutritional practices concerning cardio protection are still being discussed. Overall, reducing excess calories and eating diets high in fruits, vegetables, whole grains, nuts, and legumes; moderate in low-fat dairy and seafood; and low in processed meats, sugar-sweetened beverages, refined grains, and sodium is part of the Current guideline's recommendations. The mechanisms behind the benefits of diet to prevent cardiovascular diseases include controlling risk factors through improving glucose and lipid metabolism and reducing body weight and blood pressure. The benefit has also been associated with the anti-inflammatory effect. A diet-based approach has shown a benefiting cardiovascular health being a solid

approach to prevent cardiovascular disease. I am doing a literature review and looking at different articles to see what they say and then from those articles I will be gathering data to present. I am doing a literature review so no tests were ran but there were various studies done within each of the reviews I looked at. I am not fully done researching yet. There is an association between good diet and proper homeostatic levels within the cardiovascular system. My research is not quite complete on this front.

Daniel Herrera

Subject: Engineering, Physical & Mathematical Sciences

Synthesis and Characterization of Cationic Polysulfides for Heavy Metal Binding.

A common pollution problem is the presence of heavy metals in surface wastewater which can leach into drinking water causing adverse health effects to the populace. Sulfur-containing polymers have proven to be effective in removing heavy metals due to strong interactions via hard-soft acid-base. There is also a substantial surplus of sulfur with the US alone producing 8.6 million metric tons as of 2022. Due to this large surplus, sulfur is an abundant and inexpensive reagent. Inverse vulcanization uses sulfur as a monomer, solvent, and initiator in polysulfide formation. One of the primary challenges is ensuring that hydrophobic polysulfides can interact with aqueous metals. Water-soluble polysulfides formed by inverse vulcanization have only recently been achieved with the formation of poly(S-diallyl dimethylammonium chloride). Although these polymers have been successfully synthesized and demonstrate effective metal binding, it is unknown whether other monomers would be better suited for heavy metal binding. Three different synthetic methods were required to incorporate four different ammonium-based monomers via a radical polymerization initiated by sulfur. The polysulfides were characterized by ¹H NMR spectroscopy to tell if the material had been fully polymerized. Their solubility in water and material properties were further characterized. Aqueous heavy metal removal was tested using inductively coupled plasma optical emission (ICP-OES) analysis. By using a variety of monomers, we were able to characterize how these different monomers affect the synthesis and properties of water-soluble polysulfides.

Jordan Armstrong, Jessica Garner, Kelsey Maschek, and Victoria Higley

Subject: Health, Nutrition & Clinical Sciences

How Changes in OID and SID Factors Affect Quality Imaging

To demonstrate how OID and SID affect different aspects of image quality, thereby highlighting the necessity for optimal imaging techniques whether ambulatory or in trauma settings. SID is the distance from the image receptor to the anode in the tube, while OID is the distance from the anatomy of interest to the image receptor. ?OID and SID influence IR exposure, spatial resolution, and distortion. Carla Allen provides the definition of these factors: IR exposure is the intensity of the beam when it reaches the detector. Distortion is the variation in the size or shape of the of the anatomy from its true size. Lastly, spatial resolution is the ability to determine between two adjacent structures from another. Optimal settings and distances are not obtainable in every imaging situation such as in trauma situations where imaging is often done cross table or in a trauma bed with receptor slots located some distance below the patient. Due to these situations, OID is the most difficult factor to control.³ Likewise, in portable imaging the proper distances, such as 72" for chest x-rays, can be difficult to reach. In this experiment, we performed several exposures on different anatomical phantoms using various OID and SID factors to simulate IR exposure, distortion, and spatial resolution effects. The standard SID for chest radiographs is 72" with 0 OID The standard SID for abdomen and knee imaging is 40" with 0 OID However, best case scenario with those perfect measurements are not always feasible such as in trauma patients or portable x-rays. According to the anatomy of the phantom, the same factors were used on the various exposures using various OID measurements of 0", 7", and 13" at 40" SID and repeated at 72" SID. This strategy was

used on a knee and abdomen phantom. The OID increase was expected to magnify and distort the image and EI was expected to decrease. SID is inversely proportional with magnification/distortion.² Our results, reflected these effects with increased OID, magnification increased, while an increase in SID, and decreased magnification. A 13-inch increase in OID was a huge difference when comparing the x-rays. EI number decreased when there was an increase with SID and OID. When OID is greater than 7 inches it has a higher magnification, distortion, decrease in spatial resolution, and increased contrast. OID is important but small changes do not affect the image compared to a 13-inch increase in OID.

Samantha Howard, Jeanelle Jaeger, and Bailey Farrer

Subject: Education, Learning & Training

Importance of Shielding in Fluoroscopy Exams

To determine if using transparent upper body shields during fluoroscopy exams effects the dose received by others in the room. Using a singular fluoroscopy unit, exposures were taken at different distances with and without the transparent upper body shield attached to the ceiling. Each reading was taken with the same exposure factors for 0.7 min. CR cassettes were used to detect scatter radiation received at varying distances. PA/Radiologist reading was taken 1 foot away from primary source. Technologist reading was taken at 5 feet from primary source. Observer reading was taken at 6 feet from primary source. Readings were taken from CR scanner to determine scatter dose received. SI uses an inverse scale of measurement, which means that a higher number equals a lower exposure. This experiment showed the scatter radiation SI numbers from different areas of a fluoroscopic room. There are many instances where family members and casual observers are in exam rooms, but are not aware of the radiation hitting them. By using CR cassettes and calculating our SI numbers we found all the different viewing areas from the PA/Radiologist, technologist, and observer contained some sort of scatter. The data makes it clear that it is vital of any personnel to take into consideration their safety procedures and wear the appropriate lead shielding. Distance is also another factor to count in as we see the farther away from the source the less dose as well. So, as healthcare professionals it is crucial to remember our cardinal rules of time, distance, and shielding with fluoroscopic exams.

Logan Jennings

Subject: Business, Economics & Public Administration

Understanding the Challenges and What Works in Return-to-Work

Covid-19 changed the work environment for most organizations and, in many industries, facilitated opportunities for working from home that had not been considered previously. This has led leaders to a difficult decision: In the aftermath of the pandemic, organizations must decide if and/or when to return to in-person working, to use a hybrid method (e.g., require employees to work in-person some days of the week and allow them to work remotely the rest), or to keep employees working virtually. However, return-to-work decisions are such a new phenomenon that they have received little systematic research attention, which limits the guidance that organizational leaders can use to help make return-to-work decisions. In this project, I am using semi-structured interviews with leaders in a variety of industries to gain their in-sight and feedback into this post-pandemic problem. Employees from different industries were contacted via LinkedIn and interviewed about their experience with return-to-work decisions. In particular, I focused on asking questions about how they made return-to-work decisions, as well as how they went about implementing and earning buy-in for those return-to-work processes. This project makes an important contribution to organizational research and leadership practice by learning more about leaders' perspectives on return-to-work processes. I am also planning to expand this inquiry to explore the perspectives of employees on return-to-work and how these views might change if they had known then what they know now.

Nicole Jorgenson, Kaitlin Stern, Kasey Wells, Laura Hardy, Sienna Ragle, and Sophia Whitehead

Subject: Humanities, Behavioral & Social Sciences

Evidence for Delayed Cord Clamping in Premature Neonates

There are several methods recognized and used for blood transfusion from placenta to the baby at birth: umbilical cord milking, cut umbilical cord milking, gravity for blood transfusion, and immediate or delayed cord clamping. It appears, however, that delayed cord clamping is used with a lot of hesitancy in premature babies, because of a fear of delayed resuscitation, if needed. It has become clear that although delayed clamping is beginning to be the standard in term neonates, that is not the case in premature babies. This begs the question: if and how delaying umbilical cord clamping could improve the outcomes for preterm babies. Our developed PICOT question is, "In preterm neonates does delayed clamping compared to immediate clamping give hematological, respiratory and other benefits during the hospital stay and in the first year of life?" A randomized trial done in the UK shows that neonatal resuscitation can be provided with an umbilical cord intact in very premature babies and improve their outcomes. This study found that with delayed cord clamping neonates had lower intraventricular hemorrhage incidence and better outcomes in general. The hypothesis regarding continued umbilical cord flow and expansion of pulmonary circulation during the transition to the neonatal circulation was supported (Duley et al., 2017). A number of randomized control trials show that delayed cord clamping, described as longer than 30s., has benefits in premature babies, such as fewer deaths before discharge and less incidence of intraventricular hemorrhage. Delayed cord clamping can and should be adopted as a standard practice in preterm neonates without a fear of providing resuscitation efforts if needed, because one does not interfere with the other, but the benefits are noteworthy.

Reigan Kampmann, Hannah Gull, Sarah Mokwa, Julia Eaton, Emily Bauer, and Leslie Bergstrom

Subject: Humanities, Behavioral & Social Sciences

Bridging the Gap: Telehealth vs In-Person Mental Health Services in Rural Communities

Rural communities may face challenges in accessing health care due to factors including limited availability of healthcare providers, less access to reliable transportation, and cost of care. Telehealth is a service that offers rural populations the same medical care virtually, compared to an in-person visit, ultimately providing a solution that can bridge the gap for these specific communities. This study investigates telehealth vs in-person services for mental health care in rural areas. Our research question is: "In adults, how does increasing the expansion of telehealth services for mental health, compared to the existing traditional in-person care, contribute to enhanced access to mental health services and improved patient outcomes over a period of one-year duration?" We employed randomized controlled trials, cross-sectional, and cohort studies to get a full picture of the research. Our analysis revealed that the transition to telehealth showed positive outcomes for patients and greater outreach to rural communities during the first year of intervention. In conclusion, these findings showed telehealth can be just as effective and beneficial as in-person services for mental health.

Kyleigh Kowalski

Subject: Biological & Natural Sciences

Improvements to Quantitative Lava Morphology Classifications

Lava flows and their morphologies hold key information about their emplacement conditions, but subjective field-observation-based classifications are prone to human error and inconsistent terminology.

Recently, classification models have been utilized in an attempt to quantitatively describe and classify textures at sites on Earth that serve as analogs for lava flows on Mars and the Moon. While it is expected that measurements of surface roughness and slope are influential in differentiating between lava morphologies, different resolutions and scales will better capture specific morphologies. However, it is unknown which slope parameters are best suited to differentiate between specific lava morphologies. This project aims to identify the accuracy of lava morphology classifications using slope data collected over lava fields at Craters of the Moon (processed at 2 meter, 1 meter, 50 centimeter, and 10 centimeter resolutions, along with moving window sizes of 3x3 pixels and a 7x7 meters) to determine which combinations of resolution and scale can most accurately differentiate between the roughness characteristics of different morphologies. This project primarily uses GIS software, k-means clustering analysis in R, and scripting in Python to process and analyze large amounts of data. [Results: In Progress] Preliminary frequency distributions for slope resolutions and moving window sizes suggest that there are varying degrees of separation between lava morphologies for different combinations of slope resolution and window size. Combining several slope parameters may aid in distinguishing between morphologies that lack separation within a single set of slope parameters. [Conclusions: Incomplete] Standardizing methods for lava classifications will greatly aid interplanetary research as scientists attempt to understand and classify lava flows on other planetary bodies for which classification methods must be adaptable to different morphological subsets.

Rylee Mathison, Michelle Sclafani, Tiffaney Jeske, Jennings Leavell, Haley Wright, and Kathleen Lohse

Subject: Biological & Natural Sciences

Ammonia Volatilization in an Intermittent Stream Before and After Fire

Intermittent streams, groundwater-fed streams that do not flow all year, are becoming more common due to climate change. These streams are more common within the western United States where they tend to be drier and use prescribed fires to manage the likelihood of a wildfire, yet little is known on how the fire impacts the stream. Intermittent streams go through seasonal drying affecting the stream-bed sediment moisture content that may influence ammonia emissions. A higher sediment moisture content leads to lower ammonium concentrations, meaning that there is less ammonia to be lost through volatilization. Volatilization also takes place in nitrogen-rich soil at high pH levels. Our study intermittent watershed underwent a prescribed burn enabling for data to be gathered before the fire and shortly after the fire took place. This study can give information on how prescribed burns influence ammonia emissions. This experiment included sampling two phases before fire and two phases after fire. Sediment samples were gathered and tested for soil pH, sediment moisture, and ammonia volatilization from 13 sampling sites throughout this watershed. Soil pH was collected with a pH meter (Oakton PCTs 50 Waterproof), with three replicates taken of each sample mixed with deionized water. Sediment moisture content was collected by weighing both the wet and dry soil, the rocks were removed from the sample and subtracted from the sample total, then divided by the dry weight. Passive ammonia samplers, Ogawas, were deployed at each of the sampling sites to capture the released ammonia in the area. After collection, the collected ammonia was extracted and analyzed. The data was then normalized by dividing the end concentration of ammonia by the number of days that the sampler was out in the field; this was done because the samplers were out for different lengths of time, giving the amount of ammonia emitted each day.

Jennifer McGuinn, Leighanna Pilling, Dayana Rodriguez, Nick Sanchez, Megan Cahill, and Holly Hood

Subject: Humanities, Behavioral & Social Sciences

Balancing Choices: Hormonal Oral Contraception and Reproductive Cancer Risk

Women need accurate information to make informed decisions about their contraceptive methods. Knowing whether hormonal contraception affects cancer risk allows women to effectively weigh the benefits of pregnancy prevention against potential health risks. This study investigates the impact of oral hormonal contraception on reproductive cancer risk. Our research question is as follows: "Are women who have used hormonal oral contraception at greater risk of developing reproductive cancers in menopause compared to women who solely used non-hormonal contraception?" We analyzed longitudinal cohort studies that evaluated cancer risk among women who used oral hormonal contraceptives. The independent variable was the use (or non-use) of hormonal contraceptives, and the dependent variable was the outcome of cancer development. Our research revealed that the use of oral hormonal contraceptives increased the risk for the development of breast cancer in the menopausal period across all studies. In conclusion, these findings provide implications for re-evaluating the widespread prescription of oral hormonal contraceptives – particularly in women with increased risk and familial history of cancer.

Mya McHugh

Subject: Biological & Natural Sciences

Hypermethylated in Cancer 2 (Hic2) manipulation affects Cranial Neural Crest gene expression in *Xenopus laevis*

DiGeorge syndrome is one of the most common microdeletion syndromes in humans. Phenotypes vary but commonly include heart defects and craniofacial malformations which are the result of a hemizygous deletion of a Low Copy Repeat (LCR) portion of chromosome 22 (1). One of the genes lost in this deletion is Hypermethylated in Cancer 2 (HIC2), a tumor suppressor and developmental transcription factor (TF). Hic2 has been shown to be involved in heart development in mice, but whether HIC2 is involved in craniofacial development is still unknown (2). Further, Hic2 was observed to be upstream of genes involved in Neural Crest Cell (NCC) development. Among a myriad of structures, NCC's give rise to some cardiac tissue and the craniofacial skeleton. Thus, Hic2 may be involved in the development of both structures via regulation of NCC-specific gene expression. Here, we are using the African Clawed frog, *Xenopus laevis* (X.l.), to investigate the early developmental roles of hic2 in craniofacial development. Through in situ hybridization (ISH), expression of genes involved in NCC specification, delamination, and migration are being assessed in response to hic2 manipulation specifically in the neural/neural crest domain (3). We found that manipulation of hic2 expression levels, via microinjection of hic2 mRNA (overexpression) or hic2-targeting antisense morpholino nucleotide (knockdown), led to craniofacial cartilage malformations in X.l. embryos. Initial results from ISH show that NCC migration is impacted following changes in hic2 expression levels. Through our continued analysis of gene expression changes over developmental time we are providing insight into at what point Hic2 may function as a TF in the gene regulatory network (GRN) of NCC development. Overall, these results will aid in understanding the complex interactions of HIC2 in development and the phenotypes observed when HIC2 expression is disrupted as in Di George syndrome.

Veronica Miller, Zackry Merrill, Kyler Sayer, and Courtney Jenkins

Subject: Biological & Natural Sciences

Adhesive Performance of Polymerized Garlic Essential Oil and Plant Extracts

Inverse vulcanization is a polymerization method that utilizes elemental sulfur as the solvent, monomer, and initiator to create high sulfur-content polymers. Typically this method relies on using stockpiled

elemental sulfur, a byproduct of petroleum refinement. However, due to a shift from the use of fossil fuels, there is a predicted shortage of sulfur creating a need for alternative sulfur-containing monomers that are renewable and easily cultivated. Garlic essential oil (GEO), primarily composed of allyl sulfides, could replace elemental sulfur as a feedstock in polysulfide synthesis because it can also form sulfur radicals upon heating to initiate polymerization. Polymerizing GEO with various plant extracts has resulted in adhesive performance higher than poly(GEO) alone. The plant extracts were selected due to their ability to grow easily and abundantly in arid climates and poor soil. Further investigation was made into the characteristics that were associated with the highest-performing polymers. Plant monomers and polymers were characterized by ^1H NMR and ATR FTIR spectroscopy, DSC, TGA, and solubility testing. Additionally, the adhesive performance of these copolymers made from plant extracts was compared by finding the maximum adhesion strength and work of adhesion. Local plants were collected and placed in a 500 mL round bottom flask. The flask was then filled with chloroform and sonicated for 4-24 h, depending on the plant type. The solvent was removed by rotary evaporation and recycled. Polymers were synthesized on a 1 gram scale comprised of 0.5 gram of GEO and 0.5 gram of plant extract combined in a vial. The vial was placed in a reaction block and stirred under two synthetic conditions: $180\text{ }^\circ\text{C}$ for 30 min and $160\text{ }^\circ\text{C}$ for 15 min. 50 mg of polymer was placed on aluminum adherends and arranged in lap shear configuration before curing them at $160\text{ }^\circ\text{C}$ for 24 hours. Samples were then tested in tensile on an Instron Universal Testing System within 24 hours. Polymers were characterized using ATR FTIR and ^1H NMR spectroscopy. Solubility of cured polymers was determined by placing 100-500 mg of polymer in a vial with 5 mL of solvent for 12 hours before being filtered through a $11\mu\text{L}$ filter. Solvent was then evaporated from filter papers and the remaining mass of cured sample was used to calculate the saturated concentration and percent solubility. Top performing polymers for work of adhesion were: -Salsify extract, prickly lettuce extract, and juniper extract when synthesized at $160\text{ }^\circ\text{C}$ for 15 minutes. -Prickly lettuce extract, sagebrush extract, and curlycup gumweed extract when synthesized at $180\text{ }^\circ\text{C}$ for 30 minutes. Salsify extract, prickly lettuce, juniper extract, and juniper berry oil were polymers that performed the best in both work of adhesion and adhesion strength and were selected for further investigation. Juniper berry oil demonstrated the highest solubility across all solvents when compared against other polymers. Overall adhesive performance was best for polymers synthesized at $160\text{ }^\circ\text{C}$ for 15 minutes despite polymers not attaining full polymerization (as seen in NMR spectra). -GEO was fully polymerized with plant extracts when synthesized at $180\text{ }^\circ\text{C}$ for 30 minutes. -Copolymerization of GEO with plant extracts showed overall improvement in adhesion performance for the majority of polymers. -Adhesive performance was best for polymers synthesized at $160\text{ }^\circ\text{C}$ for 15 minutes. -p(GEO-SE), p(GEO-PLE), p(GEO-JE), and p(GEO-JBO) were polymer adhesives that performed best overall in adhesion testing and were selected for further investigation. -Solubility testing of selected high performance adhesive polymers indicated high solubility in toluene and DCM but low solubility in methanol. - ^1H NMR spectral analysis of monomers and fully polymerized polymers did not indicate characteristics that distinguish adhesives as high performance.

Kelsey Pella

Subject: Biological & Natural Sciences

Exploring Martian Volcanoes through Computer Image Analyses

Currently, there are thousands of Mars images taken by satellites that provide detailed views of the lavas, dunes, craters, and other landforms on the planet. These images are essential for understanding the history of the red planet. Mars had a quick cooling history, a lack of plate tectonics, and a large amount of volcanic activity. Lava morphologies preserve information about the composition of the molten rock, as well as the conditions experienced as it flowed and cooled, providing valuable insight into Mars' past. Classification of lava morphology on Mars is currently done by hand by scientists, a slow and subjective process; as such, we are motivated to develop a Machine Learning (ML) approach to lava morphology classification that will provide rapid and repeatable results. In addition, we are looking to determine the

distributions of common lava morphologies on Mars. To solve this problem, I will build a ML algorithm to categorize these lava flow morphologies based on their type, and these types will be analyzed for their spatial distribution. We hypothesize that there is enough visible difference between lava flow morphologies for a ML algorithm to tell them apart using HiRISE satellite imagery and that lava morphologies are randomly distributed across the planet, despite the significant differences in large-scale topography between the northern and southern hemispheres.

JadaLin Perkins

Subject: Education, Learning & Training

Reasoning Talks: Teachers' Perspectives on Implementing an Emerging Mathematical Pedagogy to Support All Learners

Understanding the role and nature of teaching and learning mathematics continues to be an important area of study and a primary area of work in K-12 schools (NCSM 2019; NCTM, 2014). However, in some classrooms, the focus of learning mathematics centers on finding answers using rote methods and solutions (Liljedahl, 2021). This perceived idea leads people to see mathematics merely as the unequivocal application of learned skills and the recollection of memorized facts (Smith & Stein, 2011) and miss the importance of mathematical reasoning in the teaching and learning of mathematics. However, mathematical reasoning is central to learning and doing mathematics which means the focus of learning in schools should be on mathematical thinking and sensemaking (Lannin et al., 2011). The inquiry question pertaining to this research is the following: What are elementary teachers' perspectives towards using an emerging discourse pedagogy to support students' mathematical reasoning? Cooperating teachers who are willing to be interviewed and observed are needed for this research. Statements from them, as well as observation and field notes, will be needed for the study. A qualitative case study will be used to develop rich descriptions of the research context (McMillan, 2016). To triangulate data, the following data collection techniques will be used: observations; interviews; and field notes. This research is still in progress. At this point in the research, however, we have discovered that teachers believe it is important to get their students to reason but find it difficult to elicit reasoning from them for a variety of reasons. Although, much of that difficulty stems from the types of questions the teachers are asking to get their students to think beyond rote answers to a more conceptual understanding. This research project is currently in progress, and a conclusion has not yet been developed.

Anna Przybylo, April Chaidez, Brett Elliott, Lorinda Gautier, Michael Vasquez, and Nicole Dewey

Subject: Health, Nutrition & Clinical Sciences

Sound Solutions: Improving Health Literacy in Deaf Communities

In deaf individuals, does implementing accessible health communication strategies, compared to traditional communication methods, result in improved health literacy and health outcomes? Quantitative data includes measurable health outcomes and health literacy rates. Qualitative data includes interviews and surveys to understand personal experiences. Quantitative data compares health literacy and outcomes before and after accessible communication strategies. Qualitative data focuses on personal experiences within the deaf community. Health Literacy: Accessible strategies improved scores from 60 to 85 (How Technology Is Improving Health Information Access for the Deaf Community, 2022). Patient Satisfaction: Accessible strategies scored 90, while traditional methods scored 55 (Morisod et al., 2022). Treatment Adherence: Accessible strategies improved scores from 50 to 80 (Mitchell, 2005). Results show accessible strategies enhance health literacy, satisfaction, and treatment adherence among the deaf. Our evaluation showed that 93.7% of survey participants felt that healthcare providers could improve their approach in meeting the needs of patients who are deaf or hard of hearing. In summary, the results of this literature

review reveal that accessible communication can improve health literacy, patient satisfaction, and adherence to treatment for this patient population. To improve communication for patients with hearing loss or deafness, there is a need for increased training for healthcare professionals, the use of sign language, and the added utilization of technology (including ASL videos and smartphone apps).

Daisy Rosas and Sage Jackson

Subject: Health, Nutrition & Clinical Sciences

Optimizing X-ray Grids for Knee Radiography

X-ray grids are an added component in an X-ray imaging exam. Grids are used for imaging exams on body parts greater than 10 centimeters in thickness. (Sources 1-3) During an exam, the grid is placed between the patient and the imaging receptor. X-ray grids are used to filter out scatter radiation and improve the contrast and clarity of the x-ray image. (Sources 1) Inside an X-ray grid, there is a combination of alternating lead strips and radiolucent material. This design makes it possible for high-energy X-ray photons to pass through the grid to reach the detector and obtain the radiograph, while the low-energy photons are absorbed by the lead strips in the grids. Continuing research and further education are being performed on the effectiveness of grids and when they should be used. (Sources 4-5) In this experiment, a variety of exposures were performed of a knee phantom to investigate the exposure index (EI) differences when using different grid ratios and different numbers of grid lines. The standard source-image-distance (SID) for a knee radiograph is 40 inches. Grid lines refer to the number of lead strips on a grid, also referred to as grid frequency. The standard exposure index (EI) range for the Carestream system used is 1200-1600. We used consistent technical factors of 60 kVp and 2 mAs for PART 1 and a variety of technical factors to replicate our EI ranges for PART 2 of the experiment. The knee x-rays taken for this experiment were performed table top to accurately line up the grids used with the image receptor. The same X-ray machine, image detector, collimation, and knee phantom were used throughout the entirety of this experiment. Once the controls were established, the only changing variable was the type of grid used throughout the experiments. We lined up the image receptor with collimator light and ensured SID was 40 inches. Centered knee phantom within the collimator light and placed the lead marker within the collimator light. Exposed knee phantom without grid at 60 kVp and 2 mAs to obtain a control image. Record the reported EI number off the control radiograph. For Part 1, The same SID, technical factors, and positioning were kept. For Part 2: The same SID, collimation, and position were kept along with the same grids but now only changing the technical factors so the recorded EI is in the standard Carestream range of 1200-1600 for each exposure. Different grids are placed between the phantom and image receptor and exposures were taken with each of the following grids: 6:1, 8:1, 8:1, 10:1, and 12:1. Ei numbers were all recorded and compared based on contrast and clarity from each of the different exposures. In Part 1, we found when we used the same technical factors while we increased the grid ratio and grid lines for a knee x-ray, the EI decreased. The grid ratio and grid lines represented an inverse relationship with the EI number. The EI number for each exposure was lower than the acceptable range. In Part 2, we found changing the kVp by an additional 10 units and the mAs by an additional 0.4-2 units helped us obtain an EI number within the standard range for the Carestream system while we increased the grid ratios and grid lines. We referred to 3 images we captured to visually compare the differences between the radiographs. Figure 1 shows an exposure that was made without a grid at 60 kVp and 2 mAs within the acceptable standard Carestream EI range. However, when we compared Figure 1 to Figure 2 and Figure 3, the visual differences of the bony anatomy, patella, and bone markings are best represented in Figure 3, where the exposure was made with a grid at 70 kVp and 4 mAs, within an acceptable EI range. Through our research, we learned the importance of grid use in optimizing the X-ray image outcome while being conscious of radiation exposure and techniques. We are interested in conducting similar research focused on chest, spine, abdomen, and shoulder radiography using grids.

Nathan Schiess and Jennifer McDonald Combe

Subject: Humanities, Behavioral & Social Sciences

Implications of Personality Profile Comprehension on Self-Esteem and Self-Concept

High levels of self-esteem (SE) and self-concept clarity (SCC) are associated with positive life outcomes. SE and SCC have also been found to be relatively stable across time. This is good news for individuals with high levels of SE and SCC, but troubling news for individuals with low levels. We explored an intervention aimed at altering SE and SCC levels. We hypothesized that increasing self-understanding via comprehension of personality assessment results and their implications would alter SE and SCC levels. We posited that increased understanding of one's personality would bring attention to individual strengths and weaknesses which would affect SE. In addition, information provided around the individual's personality would help them articulate and label individual qualities and characteristics which would impact SCC. Participants (N=124) were ISU students (75.81% female, 83.87% caucasian) with a mean age of 23. All participants completed the Big Five Inventory–2 Short Form (BFI-2-S) personality inventory. Participants were then randomly assigned to the experimental or control condition. In the experimental condition, participants received information pertaining to each of the Big Five personality traits. The participants in the control condition did not receive this information. Both groups then completed the Rosenberg Self-Esteem Scale and the Self-Concept Clarity Scale. There were no significant differences between the experimental condition and the control condition for self-esteem, $t(124) = -0.377$, $p = 0.707$, $d = -0.068$ or self-concept clarity, $t(124) = -0.341$, $p = 0.733$, $d = -0.061$. Education (personality trait interpretation information) had no significant effect on self-esteem or self-concept clarity levels. Our findings support the literature substantiating SE and SCC as relatively stable and resilient to change. Providing information about personality results did not prove to be an effective intervention for altering SE or SCC levels. Further research should be conducted to explore other interventions aimed at influencing SE and SCC levels.

Kaden Marchetti, Andrija Sevaljevic, Alex Diviney, Russell Phillips, Caleb Eardley, Rajiv Khadka, Daniel Igbowke, and Paul Bodily

Subject: Engineering, Physical & Mathematical Sciences

Redux: An Interactive, Dynamic Knowledge Base for Teaching NP-completeness

Whereas interactive dynamic visualization tools have been successfully developed and used for teaching some topics in computational theory (CT), there remains a noticeable lack of such tools for teaching NP-completeness which continues to be widely taught using paper-and-pencil methods. Despite its important theoretical and practical value, NP-completeness—and mapping reductions in NP-completeness in particular—tends to be a challenging concept for CT students to understand. We present an open-source web app called Redux that provides a dynamic interactive user interface atop a practical knowledge base of NP complete problems, reductions, and solution algorithms. A key feature of the interface is the visualization of arbitrary problem instances, mapping reductions, solutions, and gadgets—including those reachable via transitivity. The web app is designed to make the knowledge base extensible, allowing students to contribute and compare their reductions and solutions to those already available. Two surveys were administered, with respondents overwhelmingly indicating that Redux helped them to better understand mapping reductions; that they would prefer using Redux to solve similar problems manually; and that Redux makes learning NP-complete reductions more enjoyable. Redux is accessible online via <https://redux.portneuf.cose.isu.edu/>.

Mason Sistrunk

Subject: Engineering, Physical & Mathematical Sciences

Hydrolysis of Esters Using Zeolites as Acid Catalysts

Traditional ester hydrolysis reactions use large amounts of water along with the help of a strong acid or base to catalyze the reaction. These typically tend to be Brønsted-Lowry acid and bases. With the use of these acids and bases, there is a large amount of corrosive aqueous waste generated. This project aims to adapt the homogeneous process to a heterogeneous reaction to reduce waste and provide a reusable catalyst while still achieving the same high-yield results as traditional hydrolysis reactions. Zeolites have been shown to be highly adaptable alternatives to traditional Lewis acid catalysts and are more sustainable due to their easy recovery and reactivation and minimized waste stream. Zeolites are also suitable for flow reactors which are favored in industry over batch reactions which improves the applicability for industrial purposes. Currently these reactions are yielding hydration conversions between 40-89% when using aromatic esters. The recyclability of the zeolites is also being tested. Future research aims to expand the substrate scope and identify the most efficient process for zeolite recovery and reactivation as well as to test the reaction in a flow system to determine the method's viability in industrial settings.

Adam Storms and Shanae Van Leuven

Subject: Engineering, Physical & Mathematical Sciences

Plasma Methods for Novel Advanced Manufacturing Feedstock Development

Advanced manufacturing feedstock development methods are largely innovative and increasing in efficiency. Recent studies are being done to construct materials that can be more resistant to exposure in extreme environments such as those present in nuclear reactors. A large portion of these studies are constructed using wet chemistry approaches, but plasma sputtering is seen as a novel approach. This method involves gas-phase plasma synthesis that could avoid drawbacks from wet chemical methods. To explore the potentially promising new route, we are utilizing the magnetron sputtering system at Idaho State University in Dr. Rodriguez's laboratory. Here, a thin film is developed by bombarding a target material to land on a substrate. The targets will be constructed in collaboration with the Center for Advanced Energy Studies using their cryomill and have been made out of various combinations of silver, indium, tin, or zinc—all novel materials in the field. Analysis of the films are completed at ISU with the use of Raman spectroscopy and X-ray diffraction. At the William M. and Karin A. Eames Advanced Technical Education and Innovation Complex, SEM and EDS techniques will provide further analysis. This project is an introduction to the possibilities plasma sputtering unlocks in manufacturing advanced materials and could be used to support larger research efforts in the future.

Sydney Thomas, Chantel Johnson, Davis Martin, Julie Mangum, Nathaniel Griswold, and Robert Kearns

Subject: Humanities, Behavioral & Social Sciences

Empowering Patients: The Role of Early Hospice Discussions in Quality of Life

Hospice aims to enhance the highest possible quality of life for patients, regardless of the limited time they have left. With a focus on symptom management, pain relief, and addressing physical, psychological, social, and spiritual needs patients can focus on what matters most to them as they go through this tumultuous time. This study shows how educating patients about the early implementation of hospice can help improve their quality of life. The place to start is by educating physicians about hospice outcomes, and how it benefits their patients' quality and length of life after a terminal diagnosis. Our research question is, "In patients diagnosed with terminal illness, how does having conversations about hospice/palliative care early (>90 days before death) compared to having those conversations later in

the diagnosis (<90 days before death) affect quality of life?" The study we focused on performed a qualitative meta-synthesis of over 1500 articles from reputable sources that aren't healthcare providers. In the literature review, we found that those that received the consult more than 90 days before they died, used the ICU significantly less than those who were in the latter group; less than 90 days before they died. It was also found that the length of stay in hospice care was increased based on early versus late involvement. This shows that early palliative care can be beneficial for those suffering from end-stage diseases. In conclusion, through implementation of talking to patients about hospice and palliative care we can help improve quality of life in those who have a terminal diagnosis. We can help them understand that hospice is not a big scary word, but something that can be very beneficial, and help ease a large burden during a very difficult time.

April Thunell, Emma Caron, Zoe Young, Jake Hart, Sophie Stands, Caleb Brown, and Austy Mauzy

Subject: Humanities, Behavioral & Social Sciences

The Impact of Non-Pharmaceutical Pediatric Pain Management Interventions

In pediatric patients, how does the sight of needles and nurses in scrubs create a terrifying experience compared to the use of distraction techniques when using needles affect the pediatric population with procedure outcomes? For pediatric patients, the mere sight of needles and nurses in scrubs can be terrifying. The experience of needle insertion can be traumatic, and it's essential to minimize distress. As aspiring nurses with a strong commitment to pediatric care, we are conducting evidence-based research to explore the effectiveness of distraction techniques during pediatric procedures. This study aims to explore non-pharmaceutical interventions for minimizing pain and reducing anxiety in pediatric patients undergoing needle-based treatments compared to traditional methods of just using a local numbing agent. Recognizing the adverse effects of needle-related pain and stress on young patients is crucial, as it drives the adoption of strategies to alleviate stressors and enhance overall healthcare experiences. Randomized clinical trials, systemic research articles, and multicenter cohort study. In summary, through this research, we aim to help bridge the gap between theoretical knowledge and practical application by seeking out the most up-to-date innovative and evidence-based approaches to optimize the use of distraction techniques, ultimately fostering a more compassionate and effective care environment for pediatric patients undergoing medical procedures.

Aaliyah Tovar and Marley Harrison

Subject: Biological & Natural Sciences

MASP1 interacts with the BMP signaling pathway during early xenopus development

Mannan-binding lectin associated serine protease 1 (MASP1) is a component of the lectin complement pathway of the innate immune system. Previous research identified mutations in MASP1/3, the gene that encodes for MASP1, in patients with 3MC Syndrome, a developmental disorder that causes craniofacial malformations, cleft palate, and cognitive impairment. This suggests that MASP1 has an important function during early development. these experiments allows for the examination of the regulatory effects of Masp1 on BMP signaling which is essential in the patterning of ectodermal tissue. Here, we are using embryos from the African Clawed Frog (*Xenopus laevis*, X.l.) to better understand the role of Masp1 in development. Embryos were injected at the 4-cell stage into either the dorsal or ventral marginal zone with either *masp1* mRNA (overexpression) or a *masp1* targeting antisense morpholino oligonucleotide (MO, knockdown) and allowed to further develop. To investigate how Masp1 may impact BMP function, a dual luciferase assay is being performed in X.l. embryos injected with *masp1* and *bmp4* mRNA alone or in combination along with a luciferase reporter containing a BMP response element. A number of phenotypes were identified including defects in gastrulation, dorsal-ventral axis formation, and cement gland

development. In situ hybridization for genes involved in axis formation revealed changes in response to *masp1* manipulation. *masp1* overexpression showed an increase in the expression of the genes *bmp4*, *chordin*, *noggin*, and *otx2* while *masp1* knockdown results in decreased *otx2* expression. Data derived from these experiments allows for the examination of the regulatory effects of *Masp1* on BMP signaling which is essential in the patterning of ectodermal tissue. These findings demonstrate that *Masp1* impacts the expression of BMP pathway genes during gastrulation. The results of this study will shed light on how *MASP1* functions in development and how *MASP1/3* mutation could lead to 3MC Syndrome.

Heather Ray, Miriam Villa Lopez, Nelly Cyuzuza, and Mya McHugh

Subject: Biological & Natural Sciences

The transcription factor hypermethylated in cancer 2 (Hic2) influences the development of the hatching gland in *Xenopus leavis*.

DiGeorge syndrome (22q11), characterized by phenotypes including cardiac and craniofacial malformation, occurs due to a hemizygous microdeletion on chromosome 22. The hypermethylated in cancer 2 (HIC2) gene is located within the most common deletion region and previous studies showed that *Hic2* is involved in cardiac development in mice. However, it is unknown if HIC2 is involved in craniofacial development. Using *Xenopus leavis* (African Clawed frog) embryos, we found that altered *hic2* expression disrupts craniofacial cartilage formation and *Xenopus* hatching enzyme (*xhe*) gene expression was altered. We hypothesize that the development of the hatching gland, a transient structure that aids embryo hatching from the vitelline membrane, is influenced by *Hic2*. To investigate the impact of *Hic2* on hatching gland function, embryos were injected with *hic2* mRNA (overexpression) or *hic2* antisense morpholino oligonucleotides (knockdown). Individual embryos were monitored to determine the developmental stage at hatching. We found that *Hic2* manipulation results in a broadened range of timing of embryo hatching. Additionally, in situ hybridization experiments are being performed to assess changes in hatching gland gene expression over developmental time. Overall, we find that altering *Hic2* levels leads to changes in hatching gland gene expression and function highlighting a previously unknown developmental role for *Hic2*. Through continued studies, we hope to increase our understanding of how HIC2 is involved in craniofacial development and associated phenotypes in 22q11 patients.

Payton Walker

Subject: Biological & Natural Sciences

Tissue Engineering: Exploring the Potential of 3D Bioprinting for Cardiac Regeneration

Heart disease refers to different heart conditions, where coronary artery disease is the most common type of heart disease in the US. Coronary artery disease decreases oxygen-rich blood flow to the heart, causing heart attacks and damage to cardiac tissue (myocardium). Unfortunately, the rescue of the damaged myocardium remains a significant clinical challenge, limiting the heart function of 805,000 Americans every year (Centers for Disease Control and Prevention). 3D bioprinting is a promising tool for creating functional cardiac tissue. This research aims to review novel literature and analyze the progress and challenges of heart 3D bioprinting as a potential solution to repair the damaged myocardium during a heart attack. In this research, recent approaches to 3D cardiac tissue construction have shown precise control over the arrangement of cells, mimicking the architecture of native cardiac tissues. The bioengineering success of cardiac tissue construction in a dish plate relies on combining 1) bioprinting methods, including extrusion, inkjet, laser-assisted, stereolithography, or scaffold-free techniques, and 2) biomaterials to mimic cardiac micro-extracellular matrix and maintain the cell-cell interaction. While in terms of structure, the creation of the heart is promising, in terms of function, there are still several challenges to address. An important consideration is that cardiac tissue's complexity involves multiple cell types, with the vascular system crucial for meeting nutrient demands. Future research faces the exciting challenge of developing

cardiac tissues integrated with functional vasculature, linked to native circulation. Despite its significant progress and promise, cardiac tissue engineering is still incapable of culturing a truly functional heart. However, the research's success in creating whole heart organs with full functions comparable to native tissue is a promising goal to solve the short supply of donated organs and become an effective way to personalize complex organs for repair and replacement.

Virginia Wallace and Matthew Riniker

Subject: Biological & Natural Sciences

Measuring Pulmonary Immune Response to Low-Dose, Short Fiber Asbestos

Asbestos, more recently recognized in low-dose environmental exposures, can cause adverse health effects including pulmonary fibrosis and mesothelioma. The potency of long fibers is generally accepted in relation to asbestos related diseases, but the potency of short fibers is less established. Through this project, we hope to better understand the total immune response to short fiber, environmental asbestos exposure and its relation to pulmonary pathogenesis. We focused on several immune markers in the lung and pleural cavity fluids and lung tissue post-exposure to low-dose, short fiber asbestos. We hypothesized that 7-days post-exposure, proinflammatory markers would be upregulated, while at 21-days post-exposure, pro-resolving markers would be upregulated. To assess the immune response to short fiber asbestos, we utilized a mouse model of exposure. Ten-week-old, male and female C57/Bl6 mice were exposed to elutriated asbestos at a concentration of 3 µg per mouse while control mice were exposed to sterile saline (n=12). At 7-, 14-, and 21-days post-exposure, mice were euthanized and pulmonary proinflammatory and pro-resolving markers measured. Lipid mediators, cytokines, and immune cells were measured in lung tissue, bronchioalveolar lavage, and pleural washes. We measured three lipid mediators – prostaglandin and leukotriene B4 (pro-inflammatory) and lipoxin A4 (pro-resolving) – in both the pleural wash and bronchioalveolar lavage fluids and homogenized lung tissue at the three investigated timepoints. We compared lipid mediator concentrations between male and female mice to investigate whether sex contributes to early inflammatory responses to asbestos. Cytokines were assessed utilizing Cytokine Bead Array, with in vitro experiments upon macrophages demonstrating that short fiber asbestos still prompts the release of proinflammatory cytokines. Immune cell staining has denoted varying macrophage populations between exposure groups and sex, with tissue resident macrophage populations decreasing in females between the control and experimental groups. Not complete as of 2/20/2024 Also not complete as of 2/20/2024

MaKenna Winnett, Cristal Brown, Natalie Arroyave, and Naveed Akhtar

Subject: Biological & Natural Sciences

Dance, Music, and Healing: A Comparative Study in Pediatric Oncology

Pediatric cancer is a challenging journey that impacts not only physical health but also emotional well-being. Complementary interventions such as music and dance therapy can allow each child the opportunity to improve their quality of life during their standard cancer treatment and bring about a greater sense of hope for recovery. In this study, the impact of dance and music therapy compared to standard treatment without these interventions was assessed to determine the effect on the well-being of pediatric cancer patients who are undergoing chemotherapy treatment. The research PICOT question established was “In pediatric cancer patients, how does using dance and music therapy compared with standard treatment without music and dance therapy influence their overall quality of life throughout the duration of cancer treatment?” In this literature review, the use of systematic reviews and meta-analysis studies for chemotherapy patients in the pediatric patients were used to compare the impact of music therapy. The interventions compared were used to assess the various music-based interventions- dance and music

therapy specifically- on the impact of overall quality of life for these oncology patients. In summary, research has shown implementing the use of music and dance therapies into practice may provide valuable means to improve the overall quality of life for patients by offering qualitative and quantitative results. Such interventions provide an additional method of therapy for children undergoing rigorous treatment for their cancer to learn to cope with the new feelings and emotions that have arisen and to find hope in their current situation and improve their overall quality of life.

Bailey Victor and Lillie Wodskow

Subject: Health, Nutrition & Clinical Sciences

The Effect Collimation Has On EI Values

Collimation in radiography imaging is important for patient dose and image quality. Using collimation to only expose the area of interest reduces patient dose resulting in less radiation risk. EI Values can be used as a guideline to establish whether the images are of diagnostic quality. These values also help determine if the low radiation dose follows the ALARA concept to ensure optimal exposure. Using a DR x-ray room, we imaged four different phantoms (hand, knee, lumbar spine, and pelvis) comparing the first image without any collimation to multiple other images with decreased collimation. Exposure factors were: 50 kVp at 1.6 mAs for the hand, 60 kVp at 2.4 mAs for the knee, 85 kVp at 40 mAs for the lumbar spine, and 80 kVp at 6.4 mAs for the pelvis. For each of the phantoms the first image was taken with the collimation fully open at the size of 14x17 inches. For the second image the collimation was brought in on the tube head to 11x14 inches, then to 8x11 inches followed by 5x8 and 2x5 inches. The SID was constant at 40 inches. For each image the EI number was recorded. Lastly all the EI numbers were compared to determine if the the numbers decreased due to the increased collimation. We determined that an increase in collimation resulted in lower EI values in exams with thicker bone and tissue density. For example, the EI value did not change much with the hand, but with the pelvis the EI dropped when collimation was increased.

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Dawn Amos

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Adam Zambie

2nd Place

Biology - MS

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Bethany Hickey

3rd Place

Nutrition - MS

Food Processing and Appetite Regulation: How Ultra-Processed Foods May Be Influencing What and How Much We Eat



Verlyn Glenn

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