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1901-2026

Idaho State University

Research & Creative Works

SYMPOSIUM

March 18, 2026 | Event Program

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.

2026 ISU Research and Creative Works Symposium Team

Co-Leads

Amanda Bennett, Graduate School
Karissa Miller, Communication Sciences & Disorders

Committee Members

Sandy Andrade, Meridian Disability, Counseling, & Career Services
Dr. Tracy Collum, Graduate School
Dr. Tarang Jain, College of Health
Dr. Elaine Nguyen, College of Pharmacy
Sonia Martinez, Office for Research
Anna Siddoway, Graduate School
Jason Werth, Office for Research

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Letter from the ISU Office for Research

Martin Blair, Ph.D.

Vice President for Research and Economic Development

Dear 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 a new 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!

Keynote Speaker

Devaleena S. Pradhan, Ph.D.

Associate Professor

Department of Biological Sciences

Dr. Devaleena S. Pradhan is an Associate Professor of Physiology in the Department of Biological Sciences at Idaho State University, where she has been a faculty member since 2018. She earned her BS in Biology (Animal Biology) in 2004 and MSc in Zoology in 2006 from the University of British Columbia, followed by a PhD in Neurobiology and Behavior from Georgia State University in 2014. She completed postdoctoral training at the University of California, Los Angeles.

At ISU, Dr. Pradhan has built a dynamic research program supported by the Murdock Charitable Trust, Idaho EPSCoR, and the National Science Foundation. Her work integrates field and laboratory approaches to uncover the mechanisms underlying behavioral performance, demonstrating that hormonal systems are flexible, context-dependent regulators of social behavior and physiology. Her research advances understanding of plasticity in neural, motor, and reproductive systems.

Dr. Pradhan actively integrates research and teaching through a Vertically Integrated Project course and has mentored more than 60 trainees, including high school students, undergraduates, graduate students, and postdoctoral scholars. Drawing on her experiences as an immigrant and scientist, she is committed to empowering others to navigate academia and engages with her team in community-based science outreach.

Pocatello Campus Agenda

Pond Student Union Building

Wednesday, March 18, 2026

1:00 - 3:00 p.m.	**Graduate Oral Presentations**	PSUB - Upstairs Rooms & Little Wood
1:00 - 1:50 p.m.	**Undergraduate, Doctor of Pharmacy, and Health Resident Poster Session A**	PSUB - Ballroom
2:00 - 2:50 p.m.	**Undergraduate, Doctor of Pharmacy, and Health Resident Poster Session B**	PSUB - Ballroom
3:00 - 4:00 p.m.	**Graduate Poster Session A**	PSUB - Ballroom
4:15 - 5:15 p.m.	**Graduate Poster Session B**	PSUB - Ballroom
3:00 - 5:15 p.m.	**Creative Works and Refreshments**	PSUB - Wood River
3:15 - 4:45 p.m.	**Undergraduate, Doctor of Pharmacy, and Health Resident Oral Presentations**	PSUB - Upstairs Rooms & Little Wood
5:30 - 6:15 p.m.	**Keynote Speaker** **Dr. Devaleena S. Pradhan,** **Associate Professor** *Department of Biological Sciences*	PSUB - Ballroom
6:15 p.m.	**Awards Ceremony & Reception**	PSUB - Ballroom and **YouTube Live**

Meridian Campus Agenda

Skaggs Health Science Center

Wednesday, March 18, 2026

1:00 - 3:00 p.m.	**Graduate Oral Presentations**	Rooms 817 & 818
3:15 - 4:45 p.m.	**Undergraduate, Doctor of Pharmacy, and Health Resident Oral Presentations**	Rooms 817 & 818
1:30 - 2:30 p.m.	**Poster Presentation Session A**	Main Foyer
2:45 - 3:45 p.m.	**Poster Presentation Session B**	Main Foyer
4:00 - 5:00 p.m.	**Poster Presentation Session C**	Main Foyer
5:00 - 5:30 p.m.	**Reception**	Room 687
5:30 - 6:30 p.m.	**Keynote Speaker & Awards Ceremony**	Room 687 via **YouTube Live**

Please note: Zoom links for oral presentations can be found on the Symposium Website.

Oral Presentations

Graduate Oral Presentations

Only the Primary Presenter and up-to two Co-Presenters are listed. All Co-Authors are included with the abstracts.

Biological & Natural Sciences

PSUB Clearwater Room and Meridian 818

Rational Development of CDK2/4/6 Triple Inhibitors to Mitigate Resistance and Expand Clinical Applications
Janhabee Shrestha

Novokinin Analogs Synthesis, Formulation, Characterization and Pharmacokinetics/ Pharmacodynamics Studies
Pradeep Giri

Formulation, characterization and Pharmacokinetic study of a novel lipid nanoparticle formulation of bisphosphonate conjugated Angiotensin 1-7
Biwash Ghimire, Pradeep Giri, and Sina Dehestani

Moose Rub Selection and Behavior Along the South Fork of the Snake River
Scot Erickson

Characterizing a new therapeutic strategy for the treatment of necrotizing soft tissue infections caused by group A streptococcus
Anyauba Nmaju

Ecophysiology of Dormant Bacterial Endospores in Seafloor Sediments Impacted by Continuous Emission of Warm Fluids from Deep Oceanic Crusts
Rhys Ellis

Improving extremophile identification: A metagenomic-style approach to developing archaeal-specific 16S primers
Ella Bunde

Education, Learning & Training

PSUB Little Wood Room

Design and Implementation of a Reusable Web-Based Visualization System for Algorithmic and Logical Problem Solving
Andrija Sevaljevic

Lit-VR: A Gamified Virtual Reality Platform for Postsecondary Education in Literature
Shojibur Rahman

Remote Reflections: A Qualitative Study Exploring Retrospective Perceptions of Emergency Remote Instruction in Secondary School and Their Influence on Postsecondary Education Decisions
Yvette Cadeaux

The Role of Psychological Phishing Categories and Feedback-Driven Learning in Phishing Detection
Arifa Islam Champa

UME Pipeline Resolution in Idaho
Benjamin Scott

Engaging the Youth: Introduction to Cyber-Physical Systems
Marcos Cantu

Cross-Platform GUI Design for Gamified Virtual Exposure Therapy: A Usability Study
Anwar Hossain Efat

Shaping Mathematical Identity: How Reasoning-Based Discourse Empowers Student Mathematicians
Mick Morgan

Generative AI in Writing Assignments
Mahnaz Poorshahidi, Ifeyinwa Ndukuba, and Suhaib Malkawi

Engineering, Physical & Mathematical Sciences

PSUB Sargent Boardroom

Bridging the Operational Technology Forensic Gap through Automated Artifact Generation in the THROTL Framework
Kaden Mills

Performance Evaluation of Flax Fiber Reinforced Concrete Pavements with Glass Fiber Dowels
Saugat Dotel

Direct Numerical Simulation of Laminar Flame Speeds in Laser-Ignited Ammonia and Ammonia–Hydrogen Mixtures
Sharif Md Yousuf Bhuiyan and S. M. Nasim Uddin

Finite Element Simulation of full-scale Static Load Tests Using PLAXIS 3D: A Non-Destructive Approach to Pile Capacity Estimation
Md Ashrafuzzaman

Teaming Up with Autonomous AI Agents for Software Development: Where Are We Heading?
Costain Nachuma

Understanding SBOM Adoption and Quality in Open-Source Software
Md Fazle Rabbi

Health, Nutrition & Clinical Sciences

PSUB North Fork Room

Total Knee Arthroplasty with Manipulation Under Anesthesia Recovery
Jared Anderson

Own Your Voice: Advancing Consent, Violence Prevention, and Sexual Health Among Female Collegiate Athletes
Aubree Denker

Social Media Use and Restrictive Diet Trend Adoption Among Male College Students
Gavin FitzGerald

Changes to the Infrapatellar Fat Pad After ACL-Reconstruction: A Critically Appraised Topic
Maxwell Ji

SAR Guided Discovery of Positive Allosteric Modulators of α9α10 Nicotinic Acetylcholine Receptors for the Treatment of Hidden Hearing Loss
Pooja Sapkota

HPV Vaccine Perceptions on Facebook: A Qualitative Study
Rachel Hayes

Alcohol and Nicotine Use Among Collegiate Athletes
Brenna Johnson

Dual-Targeting Lipid Nanoparticles Improve Bone Tropism and Anti-Tumor Efficacy in Metastatic TNBC
Sina Dehestani

How do hearing aids benefit first-time users?
Erin Donahue

Humanities, Behavioral & Social Sciences
Business, Economics & Public Administration
Health, Nutrition & Clinical Sciences

PSUB Middle Fork Room, Meridian 817, Zoom

Preacher or Predator? Reverend Pearson from The Wind That Lays Waste From the Psychoanalytic Lens of the Narcissist
Richard Golden (Zoom)

Scaling Early Intervention: Strategically Using Asynchronous Telepractice
Marie Martinez (Zoom)

Effects of Visual Food Cues and Non-Food Cues on Delay Discounting and Salivation
Joshua Richardson

Analysis of US Data Privacy Laws and Adoption of GDPA
Anatoliy Lawrence

The Evolution of Governing in Cyberspace: Evaluating Threat Occurrence and Policy Effectiveness
Mauri Lish

The Threat of Nepotism
Baylee Boring (Zoom)

Bridging the Training Gap in Rural 911 Dispatch Agencies: A Public Administration Study
Michelle Collier

When Grief Changes the Body: Emotional Distress and Stroke Rehabilitation in a Skilled Nursing Facility
Victoria Pritchett

Assessing Nutrition Education and Counseling in Health Science Graduate Students and Practitioners
Rachel Brown

Humanities, Behavioral & Social Sciences

PSUB South Fork Room

Gendered Gaze and the Blame of the In(visible) Female Body in Ancrene Wisse
Ifeyinwa Ndukuba

The Pressure to Be Perfect: Perfectionism, Eating Pathology, and the Moderating Roles of Self-Esteem, Body Dissatisfaction, and Social Support in College Student Athletes and Non-Athletes
Emme Tucker

From Follicle to Foundation: Establishing a Comparative Microscopic Hair Reference Collection
Rachel Sutherland

A Meta-Analysis of Client Preferences for Distance versus In-Person Delivery of Psychotherapy
Katelyn Cathcart

Engagement in and Attitudes Toward Artificial Intelligence Use Among Psychotherapy Researchers
Eliana Claps

Parent-Child Interaction Therapy–Middle Childhood (PCIT-MC): Pilot Trial Evaluation of Developmentally Adapted Treatment Modules
Ciara Gaches

Cybersecurity in the Public Eye: Insights from Reddit Users Discussions
S M Mahedy Hasan

Sexual health knowledge, sexual self-efficacy, and sexual health risk behaviors in women with and without experiences of sexual violence
Kaylin Muller

Clinical Utility and Impact of Phosphatidylethanol (PEth) Testing in Patients Pursuing Kidney Transplantation
Rachel Meyer

Navigating Community Research
Jocelyn Nichols

Undergraduate and Doctor of Pharmacy Oral Presentations

Only the Primary Presenter and up-to two Co-Presenters are listed. All Co-Authors are included with the abstracts.

Biological & Natural Sciences

Engineering, Physical & Mathematical Sciences

PSUB Clearwater Room and Zoom

Vending Machine "Digital Twin"
Isaac Wickard, Sydney Morris, and Markus Pettinger

Experimental Identification of Dynamic Battery Impedance for Predicting Embedded System Voltage Droop
Levi Farber

Enhanced Properties of Polymerized Garlic Essential Oil with Plant Extracts and Elemental Sulfur
Veronica Miller

Body Orientation During the Performance of Parental Behaviors in the Bluebanded Goby (Lythrypnus dalli)
Reagan Piel

Basin development along the proto-Andean margin: Field observations from Triassic–Jurassic deposits in coastal Chile (~32°S)
Tiana Hursh and Parker Hazelbush

Microbial Specialization in Male Pregnancy
Jaime Fong (Zoom)

Humanities, Behavioral & Social Sciences

Health, Nutrition & Clinical Sciences

Education, Learning & Training

PSUB Middle Fork Room and Meridian 817

Behavioral and neural consequences of non-invasive brain stimulation for improving vision
Isabel Harbig

Assessing the Potential of GABA-Producing Probiotics for Healthy Aging
Sanaly Nava

Determinants of Oral Health Care Among Idahoan Pregnancies: Pregnancy Risk Assessment Tracking System (PRATS) Analysis
Amina Miljkovic

Supporting Remedial Mathematics Students using Online Assessment Scaffold-Feedback
Zoe Tassava

The Black History of Pocatello, Idaho: Community, Resilience, and Civil Rights in the American West
Michael Strickland

Pilot of an Adapted Drug-Induced QTc-Prolongation Outpatient Polypharmacy Screening Tool
Victoria Pham

Creative Works Presentations

PSUB Quad Lounge

Graduate Creative Works

CW 4 **Somnambulist**
Lauren Elmore

Undergraduate Creative Works

CW 1 **A Sweet Surprise**
Kayci Breshears

CW 27 **Blueberry Pie**
Hailey Neubauer

CW 6 **Breakfast nails**
Paige Hansen

CW 9 **Campfire Roast**
Aramy Glaser

CW 30 **Candy Nails**
Rori Mecham

CW 28 **Charcuterie Chic**
Emry Harward

CW 18 **Cherry Cola Styled Hair**
Marissa Gallup

CW 3 **Cherry Ice Cream**
Kya Downing

CW 2 **Cotton Candy**
Kazlyn Freestone

CW 21 **Fair of '07**
Isi Barkdull

CW 19 **How Grape!**
Jolie Baker

CW 14 **Inverted Harvest**
Sydney Strong

CW 5 **Layered Faith**
Isabel Harbig

CW 24 **Pineapple Updo**
Brylei Beorchia

CW 16 **Ramen Cup**
Brooklyn Kimball

CW 31 **Strawberries pie nails**
Makayla Metcalf

CW 23 **Strawberry**
Kacie Hansen

CW 20 **Strawberry Ice Cream Dreams**
Artemis McEwen

CW 29 **Sushi**
Reace Swore

CW 25 **Sushi Playe**
Emma Birch

CW 32 **Taco Tuesday**
Alisa Smith

CW 11 **Taste of ISU**
Brooklynn Beckstead

CW 12 **Taste of ISU**
Brooklynn Crockett

CW 10 **Taste of ISU**
Kelsey Coles

CW 22 **Taste of ISU**
Tiana Hernandez

CW 8 **Taste of ISU**
Beezy Weigle

CW 26 **Taste of ISU**
Ava Wilson

CW 13 **Taste of ISU Creative Works**
Morgan Armstrong

CW 17 **The Hairy Harvest**
Amariah Rodriguez

CW 7 **Tomato Tomatah**
Lily Rasmussen

CW 15 **When the Witch Becomes the Hunter: Illustrating Shared Characteristics of Contemporary United States Politics and the European Witch Hunts**
Amanda Coburn

Poster Session Presentations

Graduate Poster Sessions

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Pocatello Poster Sessions (P) – Ballroom
Session A: 3:00 - 4:00 PM
Session B: 4:15 - 5:15 PM

Meridian Poster Sessions (M) – Meridian Foyer
Session A: 1:30 - 2:30 PM
Session B: 2:45 - 3:45 PM
Session C: 4:00 - 5:00 PM

Biological & Natural Sciences

#38A P **A journey into the unknown: Discovery and Genome Annotation of Novel Bacteriophage Shroomer**
Madison Nations, Siena Levine, and Brenn Brown

#9C M **Characterizing a new therapeutic strategy for the treatment of necrotizing soft tissue infections caused by group A streptococcus**
Anyauba Nmaju

#12B P **Daytime Oviposition and Embryonic Development of the Great Basin Spadefoot in Idaho, USA**
Scot Erickson

#34B P **Ecophysiology of Dormant Bacterial Endospores in Seafloor Sediments Impacted by Continuous Emission of Warm Fluids from Deep Oceanic Crusts**
Rhys Ellis

#17B P **Identifying the molecular targets of Masp1 protein during embryonic development**
Nelly Cyuzuza

#19B P **Impact of Soil Amendments Targeting Roadside Revegetation on Soil Microbial Communities**
Eric Christen

#16B P **Mas Signaling: A Novel Anti-Proliferative Strategy in Cancer Cells**
Sina Dehestani

#6A P **Predator impacts on an omnivorous, eusocial species and mutualistic partners in the sagebrush steppe**
Anna Schill

#22A P **Short Libby Amphibole fibers induce pulmonary inflammation in mice up to 21 days post-exposure**
Larisa McOmber

#21 B P **The novel NRAMP-type transporter in pneumococcus is repressed during iron replete growth**
David Burnett

Business, Economics & Public Administration

#33A P **Bridging the Training Gap in Rural 911 Dispatch Agencies: A Public Administration Study**
Michelle Collier

Education, Learning & Training

#14B P **Cross-Platform GUI Design for Gamified Virtual Exposure Therapy: A Usability Study**
Anwar Hossain Efat

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Yvette Cadeaux

#20B P **The Role of Prenatal Maternal Education in Increasing Newborn Visits**
Weston Burrup, Emma Hammer, and Evan Taylor

#34A P **The Role of Psychological Phishing Categories and Feedback-Driven Learning in Phishing Detection**
Arifa Islam Champa

Engineering, Physical & Mathematical Sciences

#25A P **A New Approach to Serial Number Restoration via Step-heating Thermography**
Ivy Marshall

#13A P **Comparing Gaze-Pinch and Touch Interaction for Gaming on Apple Vision Pro**
Aney Rani Paul

#9B P **Evaluation of Industrial By-Products as Supplementary Cementitious Materials in Concrete**
Abinash Gauta and Abiral Tiwari

#37A P **Finite Element Simulation of full-scale Static Load Tests Using PLAXIS 3D: A Non-Destructive Approach to Pile Capacity Estimation**
Md Ashrafuzzaman

#1B P **From Sulfur Waste to Functional Materials: Inverse Vulcanization for Aqueous and Mechanical Applications**
Will Kimball

#31A P **Lateral Performance of Veneer Laminated Timber Wall Panel System**
Amit Koirala and Rosham Sharma

#35B P **Seeing Inside Torrefied Biomass: How 3D X-ray CT images and AI Reveal Its True Quality**
Antora Dev

#23B P **Streamflow Trend Analysis and Flood Inundation Modeling: Supporting Restoration of the Fort Hall Bottoms**
Sagar Bhusal

#30B P **Teaming Up with Autonomous AI Agents for Software Development: Where Are We Heading?**
Costain Nachuma

#7B P **The Quiet Contributions: Insights into AI-Generated Silent Pull Requests**
S M Mahedy Hasan

#29B P **Understanding SBOM Adoption and Quality in Open-Source Software**
Md Fazle Rabbi

Health, Nutrition & Clinical Sciences

#38B P **A diabetes video education for K-12 school personnel**
Jaclyn Doehler (Zoom)

#24A P **Acute Ischemic Cerebrovascular Accident Involving the Left Middle Cerebral Artery in a Young Adult Female with Marfan Syndrome: Deficits and Management**
William Mayo

#6B P **Analysis of Patient-Guided Precautions of Post-ACLR Recovery**
Cody Hosteen

#7A M **Aquatic therapy as a solution for gait and functional mobility when upper-extremity weight-bearing restrictions limit assistive device use following polytrauma**
Emma Saccoman

#10A M **Aquatic-to-Land Rehabilitation Improves Function in ACL Rupture with Early Osteoarthritis**
Braden Powell

#7A P **Are they medically stable? The role of physical therapist in the acute care setting in determining medical stability in patients' post cardiac surgery: case study report**
MacKenzie Saunders

#2C M **Blood Flow Restriction Training Following Distal Triceps Tendon Repair: A Case-Based Approach to Clinical Decision-Making**
Stephanie Coddens

#5C M **Breaking Through Pain: A Multimodal Physical Therapy Approach to Chronic Lumbar Radiculopathy**
Brett Bergler

#8B M **Case Report: Addressing Fear Avoidance in Low Back Pain Through Functional Strengthening and Patient Education**
Morgan Duplanty

#7C M **Case Review: Cerebral Palsy with spastic quadriplegia**
Caden Ashdown

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Maxwell Ji

#20A P **Chronic Osteomyelitis and Early Care**
Taylor Moore

#3B M **Conservative management for suspected labral injury in a middle-aged male: A single case study**
Keegan Mulhill

#9B M **Conservative Management of Posterior Cruciate Ligament: A Case Report**
Sophia Diffin

#6A M **Conservative Orthopedic Rehabilitation Following MVA Injury in a Young Adult Male with Hemophilia**
Kathryn Schultz

#15A P **CVA Rehabilitation in an Elite Athlete Compared to the General Population: a Clinical Case Study**
Tyler Otterlei

#5B P **DNP Project Proposal: DNP Women's Health Curriculum**
Rachel Jensen

#4A P **Early Atypical Sensory Presentation as a Sentinel Sign After Total Hip Arthroplasty: A Single Case Study**
Matthew Thurston and Doug Winward

#4C M **Early Restoration of Functional Capacity in Subacute Stroke Within Home Health: A Single Case Study**
Devin Braaksma

#4B P **Effectiveness of Pelvic Physical Therapy for Urinary Incontinence in the Presence of Pelvic Organ Prolapse: A Case Report**
Hannah Johnson

#8B P **Effects of Early High Intensity Intervention for Patients with Acute Ischemic Strokes: A Case Report**
Christian Haragos

#3A P **Fear Avoidance as a Barrier to Early Postoperative Total Shoulder Arthroplasty Rehabilitation: A Single Case Study**
Sydney Walsh

#11A P **Functional Outcomes Following Postoperative Rehabilitation After Left Rotator Cuff Repair: A Case Study**
Edward Prince

#1B M **Improved Strength and Motor Control Decrease Pain Despite Persistent In-Toeing Gait: A Pediatric Case Report**
Austin Oswald

#25B P **Integrating Postpartum Depression Screening in a Pediatric Care Setting: A Quality Improvement Project**
Jessica Baird

#2A P **Interactive light board training for sensorimotor integration in Post-Traumatic Parkinsonism: a single-case report**
Hollee Warren

#5A M **Interventions resulting in a return to sport post-discectomy in a young athlete: A single case study**
Amanda Travis

#6C M **Management of Chronic Cervicogenic Headache Without Cervical Manipulation: A Single Case Study**
Austin Bedke

#28A P **Managing CMT Disease Symptoms, What Works and What's Missing: A Case Report**
Nathan Leavitt

#3C M **Milestone-Based Early Protected Loading After Percutaneous Achilles Repair: A Case Study**
Alyson Bybee

#8A M **Multifidus Activation Intervention for Chronic Low Back Pain: A Single Case Study in a Middle Aged Male**
Kathleen Ryan-Lobato

#9A M **Multimodal Physical Therapy Management of Mid-Thoracic Pain in a Work From Home Employee: A Case Study**
Dillan Ritmiller

#32A P **Own Your Voice: Advancing Consent, Violence Prevention, and Sexual Health Among Female Collegiate Athletes**
Aubree Denker

#14A P **Pain Without Pathology: A Case Of Nociplastic Pain After Broström–Gould ATFL Repair**
Brandon Parra

#22B **Parkinson's Disease Impact on Early Mobility Following Total Knee Arthroplasty: A Single Case Report**
Jillian Brown

#5B M **Pectoralis Major Tendon Repair Rehabilitation Progression in a Pediatric Athlete: A Single Case Study**
Derek Knight

#1C M **Physical Therapy Management of Eustachian Tube Dysfunction - Associated Ear Pressure: A Single Case Study**
Breanna Danklefsen

#26A P **Physical Therapy Management of Post Laminectomy Complications in the Acute Hospital Setting**
Matthew Mansfield

#18B P **Physical Therapy-Led Differential Diagnosis of Lumbar Spinal Stenosis in a Post-Stroke Patient: A Case Study**
Caitlyn Cronce

#30A P **Possible Implications of GLP-1 Use in a Multimodal Physical Therapy Approach for Cervical Pain: A Case Report**
Verene Kwong

#7B M **Progressive Proprioceptive Neuromuscular Facilitation–Based Dynamic Stabilization for Nonoperative SLAP and Infraspinatus Tears: A Case Report**
Garrett Hall

#4A M **Psychosocial Benefits of Patient Education in Chronic Low Back Pain: Single Case Study**
Riley Trovillion

#1A P **Redirecting Shoulder Interventions Through PT Clinical Reasoning: A Case Study**
Bryndel Young

#2B M **Rehabilitation of Cervical Referred Pain and Fear Avoidance Behaviors Following C7 Fracture: A Case Study**
Sydney Nogosek

#5A P **Restoring Movement Symmetry Through Powerlifting-Based Rehabilitation in a Patient With Multisite Pain: A Case Study**
Jaron Taylor

#8A P **SAR Guided Discovery of Positive Allosteric Modulators of α9α10 Nicotinic Acetylcholine Receptors for the Treatment of Hidden Hearing Loss**
Pooja Sapkota

#33B P **Social Media Use and Restrictive Diet Trend Adoption Among Male College Students**
Gavin FitzGerald

#37B P **Stakeholder Perceptions of Implementing Postpartum Depression Screening Using the Edinburgh Postnatal Depression Scale During Infant Well-Child Visits in Southeast Idaho**
Quincy Hardy

#26B P **Streamlined MDT Identified Directional Preference in Lumbar Radiculopathy: A Case Study**
Tyler Ackerschott

#3A M **The Effect of Progressive Resistance Exercise and Instrument Assisted Soft Tissue Mobilization on Greater Trochanteric Pain Syndrome: A Case Study**
Caleb Warnken

#6B M **The Effects of Functional Manual Therapy on Pain and Function in an Adult with Subacromial Pain Syndrome: A Case Study**
Payton Harrell

#24B P **The Importance of Early Rehabilitative Interventions in Multiple Sclerosis: a Single Case Study**
Kayla Berheim

#23A P **The psychosomatic effects on ACLR physical therapy in a female high school soccer player: a case report**
Zion McCain

#9A P **The Role of Physical Therapists Balancing Protocols, Pain, and Overuse: a Case Report**
Carson Sadlek

#27A P **Therapeutic Effects of Various Wavelengths of Light Therapy**
Christopher Louie

#36B P **Total Knee Arthroplasty with Manipulation Under Anesthesia Recovery**
Jared Anderson

#4B M **Use of Rhythmic Auditory Stimulus interventions in a patient presenting with Parkinsonism and Cerebrovascular Accident history. A single case study**
Kal Lunders

#8C M **When Grief Changes the Body: Emotional Distress and Stroke Rehabilitation in a Skilled Nursing Facility**
Victoria Pritchett

Humanities, Behavioral & Social Sciences

#17A P **A Comparative Analysis of Digital Discourse on Bad Bunny half-time show performance**
Sadicamin Oboh

#2B P **AI at the Ballot: Deepfake Campaigns, Framing, and Voter Engagement - Evidence from South Asia**
Md Akil Khan and Sadman Sakib

#12A P **Effects of Acute Stress on Food and Monetary Delay Discounting**
Brianna Prien

#15B P **Looking at Brain Activity in Autism: A Review of EEG Mirror Neuron System Research**
Julia Duran

#16A P **Manipulating Self-Efficacy to Probe Metacognitive Monitoring and Control in Musical Pattern Recognition**
Donovan Olson

#18A P **Media Exposure and Public Confidence in the U.S. Supreme Court**
Md Masud Un Nabi

#10A P **Medial-Frontal Control Signals in Musical Expectancy Conflict (Proposal)**
Juergen Riedelsheimer

#10B P **Multi-Modal Validation of the Psychosocial Strengths Inventory for Children and Adolescents (PSICA): Concordance between Caregiver-Report and Behavioral Observation**
Ciara Gaches

#2A M **Narrative Elicitation in Children with Language and Literacy Impairments: Effects of Stimuli Type and Verbal Model**
Chloe Young

#29A P **Perceptions of Interprofessional Collaboration Between Athletic Trainers and Physical Therapists**
Aspyn Lacey

#21A P **Proxies in Practice: Evaluating 3D-Printed Cranial Replicas for Use in Osteometric Analysis**
Spencer Moore

#3B P **Responsible Conduct of Research: Attitudes Towards Authorship, Participant Interaction, and Responsibility in Research Practices**
Mayley Johnson

#13B P **The Impact of Chronic Pain on Delay Discounting: An Examination of Temporal Decision-Making**
Lauren Elmore

#19A P **The Relationship Between Trait Anxiety and Metacomprehension Accuracy**
Abigael Mukaz Ntwal

#31B P **The Relationships Between Hazardous Alcohol and Cannabis Use and Suicidal Thoughts and Suicide Attempts**
Rachel Meyer and Kali Earl

#11B P **Unearthing Elite Deathways: Sex, Power, and the Complexity of Maya Grave Goods from Core to Periphery**
Candice Flowers

Undergraduate, Doctor of Pharmacy, and Health Resident Poster Sessions

Only the Primary Presenter and up-to two Co-Presenters are listed. All Co-Authors are included with the abstracts.

Pocatello Poster Sessions (P) – Ballroom
Session A: 1:00 - 1:50 PM
Session B: 2:00 - 2:50 PM

Meridian Poster Sessions (M) – Meridian Foyer
Session A: 1:30 - 2:30 PM

Biological & Natural Sciences

#30B P **Baseline Gating Properties of Wild-Type hNaV1.2 Voltage-Gated Sodium Channels**
Soha Haniyyah and Jordyn Steers

#28A P **Basin development along the proto-Andean margin: Field observations from Triassic–Jurassic deposits in coastal Chile (~32°S)**
Tiana Hursh and Parker Hazelbush

#16A P **Investigating the Presence of the Ice Age horse Haringtonhippus in the American Falls Collection of the Idaho Museum of Natural History**
Miriam Fridel

#10B P **Investigating the role of inorganic phosphate in Streptococcus pneumoniae capsular polysaccharide production**
Noah Thompson

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Saige Rigby

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Veronica Miller

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#25B P **Night and day: Illuminating the scleral ring anatomy and diel activity patterns of stem reptiles**
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Grace Cain

#20B P **Use of a neonatal rat model in behavioral studies to investigate neural plasticity and recovery of function**
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Engineering, Physical & Mathematical Sciences

#15B P **Analysis of DOE Package Testing Certification Experiment**
Tek Jones, Colten Moser, and Chad Isaacson

#27B P **Bridging Security and Usability in Handheld and Computer Devices**
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#32A P **Experimental Identification of Dynamic Battery Impedance for Predicting Embedded System Voltage Droop**
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#32B P **Experimental Investigation of Mechanical Properties of Concrete with Upcycled Fine and Coarse Aggregate**
Uddhav Dev

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Health, Nutrition & Clinical Sciences

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Ashley Quigg

#30A P **Assessing the Potential of GABA-Producing Probiotics for Healthy Aging**
Sanaly Nava

#1A M **Community Pharmacy Prescribing to Close Gaps in Patient Care**
Gracie Garringer

#7A P **COVID-19 impact on the mental health of medical students**
Mitchell Allen

#26A P **Effect of OID on Radiographic Magnification**
Mateya Rogers and Sydney Summers

#24A P **Effect of Shielding on scatter radiation**
Saydi Whyman and Sydney Kelley

#23A P **Effects of Scatter Radiation on Occupational Dose**
Rod Merrell

#10A P **Enhancing Osteoporosis Management: An Emphasis on Bisphosphonate Optimization**
Mary Cutright

#11A P **Evaluating Clinical Inertia in GLP-1 Receptor Agonist Initiation and Titration in a Federally Qualified Health Center**
Kerrin Kramer

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Kristen Caldwell

#23B P **Light Field Accuracy (Congruence)**
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Abby Bowman

#22A P **Quantitative Assessment on the Effect of Distance and Position on Scatter Radiation**
Levell Strong and Hannah Archibald

#25A P **Radiation Exposure and Pediatric Diapers**
Kenadee Searle, Jocelin Pelayo-Cardona, and Kylie Higdon

#27A P **Scatter Levels by Height in a Danelius-Miller Method**
Tessa Smith and Abigail Harper

Humanities, Behavioral & Social Sciences

#9B P **Disability Bias in Clinical Psychology Program Admissions in the Pre-Application Stage**
Madelyn Shaw and Laurana Anderson

#21B P **Emotional Regulation Skills as a Mediator Between Sleep Quality and Somatic Symptoms**
Jaden Davis

#14A P **Satisfaction with Life and Creativity**
Justin Lupo

List of Student Presenters

Only the Primary Presenter and up-to two Co-Presenters are listed. All Co-Authors are included with the abstracts.

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Graduate Abstracts

Tyler Ackerschott

Subject: Health, Nutrition & Clinical Sciences

Streamlined MDT Identified Directional Preference in Lumbar Radiculopathy: A Case Study

Lumbar radiculopathy can rapidly limit function and increase fear-avoidance. Mechanical Diagnosis and Therapy (MDT) identifies directional preference through repeated movement testing, but inefficient sequencing can provoke symptoms and feel like "trial-and-error." The purpose of this study is to describe a streamlined MDT sequence used to identify directional preference efficiently while minimizing symptom exacerbation and supporting functional recovery. This case study describes a patient with imaging-confirmed L3–L4 disc bulge presenting with left lower extremity radicular symptoms and flexion-sensitive low back pain. Symptoms were aggravated by forward flexion and functional tasks (bending; lifting the left leg to enter a vehicle) with reduced pain at rest. Neurodynamic testing was positive on the left (straight leg raise 45°; slump). Neurologic screening revealed mild left knee extension weakness (4+/5), slightly diminished medial lower leg sensation, and reduced left patellar reflex. No systemic red flags were present. Repeated movement testing was intentionally sequenced based on irritability and symptom behavior; extension-based loading produced partial centralization and reduced distal symptoms within the initial session. Treatment emphasized repeated lumbar extension, education on symptom monitoring and activity modification, early avoidance of repeated flexion, and graded reintroduction of flexion/loading over 6 weeks. At evaluation: Numeric Pain Rating Scale (NPRS) 7/10 with flexion; Oswestry Disability Index (ODI) 38%; Patient-Specific Functional Scale (PSFS) average 3/10. At discharge (6 weeks): NPRS 1–2/10 with high-load flexion only; ODI 8%; PSFS average 8/10. Distal radicular symptoms resolved and the patient was independent with self-management. This case suggests that MDT can function efficiently as both assessment and intervention when testing is intentionally sequenced using screening findings, irritability level, and clear stop rules. In conclusion, a streamlined MDT examination may reduce symptom provocation and support meaningful functional recovery in lumbar radiculopathy.

Jared Anderson

Subject: Health, Nutrition & Clinical Sciences

Total Knee Arthroplasty with Manipulation Under Anesthesia Recovery

Total knee arthroplasty (TKA) is commonly performed to reduce pain and improve function in individuals with advanced knee osteoarthritis. While most patients demonstrate steady postoperative improvement, some experience delayed progress marked by persistent pain, limited range of motion, and functional restriction. Postoperative knee stiffness can significantly impair outcomes. When conservative management fails to restore motion, manipulation under anesthesia (MUA) may be used. The purpose of this case study is to describe the presentation, rehabilitation management, and outcomes of a patient with delayed progress following TKA who subsequently underwent MUA. The patient was an adult status post primary TKA referred to outpatient physical therapy with complaints of persistent stiffness, pain, and difficulty with functional tasks. Initial evaluation revealed 80 degrees of knee flexion, a 5 degree extension lag, pain rated 10/10, swelling, and impaired gait mechanics. Functional limitations included difficulty with transfers, stair negotiation, and prolonged ambulation. The patient attended therapy three times per week following surgery. Despite consistent participation, flexion plateaued at 95 degrees, raising concern for arthrofibrosis. MUA was performed, improving flexion to 110 degrees immediately post-procedure. Therapy frequency increased to five visits per week to preserve gains. By discharge at 12 weeks postoperatively, the patient achieved 130 degrees of knee flexion, full extension, decreased pain to 5/10, and improved functional performance on the Lower Extremity Functional Scale. Initial treatment emphasized edema control, pain management, restoration of extension, and progressive flexion mobility. Following MUA, rehabilitation focused on aggressive range of motion preservation, stretching, cycling, strengthening, and functional retraining. This case demonstrates that early recognition of range of motion plateau and timely MUA, combined with intensified rehabilitation, can improve mobility and functional outcomes in patients with postoperative knee stiffness. Objective monitoring and collaboration with the surgical team are essential when progress stalls after TKA. Timely intervention and focused rehabilitation can restore motion and optimize recovery.

Caden Ashdown

Subject: Health, Nutrition & Clinical Sciences

Case Review: Cerebral Palsy with spastic quadriplegia

Cerebral palsy (CP) is a lifelong neurological condition, yet most research and clinical guidance focus on pediatric populations, leaving limited evidence to support outpatient management of adults with severe motor involvement. This case report describes the examination, intervention, and clinical reasoning used in the long term outpatient care of an adult with spastic quadriplegic CP who demonstrated minimal functional change during treatment. The patient, a man in his 30s with severe spastic quadriplegia, deafness, and limited signing ability, attended weekly outpatient physical therapy for approximately four years. His primary goals were to manage hypertonicity, reduce discomfort associated with prolonged wheelchair use, and maintain his current level of function. Treatment sessions consisted of contracture management stretching, passive range of motion, and simple cognitive engagement activities to support participation. Within the final two weeks of care, bilateral upper extremity strengthening was introduced to improve his ability to assist with pressure relief and basic activities of daily living. The Lower Extremity Functional Scale was attempted at the initial evaluation and resulted in a score of zero, reflecting its inappropriateness for individuals who are wheelchair dependent with profound motor impairment. Clinical outcomes were therefore monitored through tone levels, comfort, participation, and the patient's ability to assist with repositioning. No measurable functional gains were observed; however, the patient maintained his prior level of function, which aligns with the goals of maintenance based therapy for adults with severe CP. This case highlights the challenges of providing care in a general outpatient setting without specialized neurological equipment and emphasizes the importance of tone management, caregiver support, and quality of life–focused interventions. It also underscores the gap in evidence based outpatient guidelines for adults with severe CP and the need for outcome measures appropriate for individuals with limited voluntary movement.

Md Ashrafuzzaman

Subject: Engineering, Physical & Mathematical Sciences

Finite Element Simulation of full-scale Static Load Tests Using PLAXIS 3D: A Non-Destructive Approach to Pile Capacity Estimation

The accurate estimation of the ultimate bearing capacity of the pile foundation is essential for designing a safe and cost-effective deep foundation design. The Static Load Test remains one of the most reliable methods for this purpose; however, the process is inherently destructive and requires the physical loading of a test pile to near-failure and is absurdly expensive and time-consuming for standard use. Analytical and direct approaches offer a non-destructive alternative, but those approaches tend to do the oversimplification of the soil-structure interactions and thus yielding a conservative estimate that lack the precision required for site-specific design. This study estimates the effectiveness of three-dimensional finite element analysis using PLAXIS 3D as a non-destructive, economical alternative to the static load test for estimating the ultimate bearing capacity. A numerical model was developed based on a real a real geotechnical investigation data; including the soil stratigraphy, SPT values, and shear strength parameters from a construction site in Dhaka, Bangladesh, and validated against field static load test data for a cast-in-situ reinforced concrete pile (diameter 558.8 mm, length 13 m). Five mesh configurations ranging from very coarse to very fine were evaluated, with the very fine mesh consistently producing the closest alignment with field observations. The PLAXIS 3D simulation estimated to have an ultimate bearing capacity of 183 tonnes, compared to 186 tonnes from the full-scale static load test, representing a deviation of only 1.6%. In contrast to the analytical and direct approaches where the produced estimates were of 181 and 122 tonnes respectively, reflecting their tendency toward conservatism rather than site specific accuracy. These findings demonstrate the capabilities of a properly calibrated and validated PLAXIS 3D model that can offer a reliable, accurate, and non-destructive, efficient estimation of the pile capacity that once site-validated can be repeatedly applied to reduce the over dependency on destructive field testing which further saves time, cost and ultimately minimized the environmental disturbance.

Jessica Baird

Subject: Health, Nutrition & Clinical Sciences

Integrating Postpartum Depression Screening in a Pediatric Care Setting: A Quality Improvement Project

The purpose of this Doctor of Nursing Practice project is to implement an evidence-based postpartum depression (PPD) screening protocol within a pediatric care setting in accordance with the American Academy of Pediatrics (AAP) guidelines. PPD is a prevalent mental health condition that can significantly impact a child's health and development. Despite recommendations from the AAP and other leading health organizations, many pediatricians have not yet incorporated formalized PPD screening into their clinical practice. Pediatricians must prioritize maternal mental health, as their actions can significantly influence the lives of mothers, children, and families. PPD screening using the Edinburgh Postnatal Depression Scale (EPDS) was implemented during the 2-, 4-, and 6-month well-child visits. The Plan-Do-Study-Act (PDSA) model served as the theoretical framework guiding staff training, workflow evaluation, and revision. A post-implementation survey using the Normalization Measurement Development Questionnaire (NoMAD) was conducted to assess provider perceptions of the screening protocol, gain insight into the implementation process, and evaluate screening sustainability. During the implementation phase, a total of 690 PPD screenings (n = 690) were conducted. 81 (11.8%) mothers screened positive, 604 (87.5%) screened negative, and 5 (0.7%) mothers declined screening. 4 of the 8 providers completed the NoMAD post-survey, yielding a 50% response rate. Provider perceptions of the screening protocol were mostly positive, with 57% (34 of 60) of survey items indicating agreement and only 18% (11 of 60) indicating disagreement. Providers demonstrated strong coherence, with time burden emerging as the primary barrier threatening project sustainability. This project demonstrated a sustainable screening protocol that can be successfully integrated into routine well-child visits to increase formalized PPD screening rates in pediatric practice. Future work can explore workflow optimization strategies to reduce the time burden associated with screening administration and increase pediatric practice adherence to AAP screening guidelines.

Austin Bedke, Taylor Cavazos, and Tarang Jain

Subject: Health, Nutrition & Clinical Sciences

Management of Chronic Cervicogenic Headache Without Cervical Manipulation: A Single Case Study

Cervicogenic headache is a common sequela of whiplash associated disorders and is linked to substantial disability and reduced work tolerance. Cervical manipulation is frequently supported in the literature for symptom reduction; however, patient preference or perceived risk may limit use. Limited evidence describes outcomes when manipulation is declined. The purpose of this case study was to describe the examination, multimodal management, and outcomes of a patient with chronic cervicogenic headache treated without manipulation. This case study was conducted in an outpatient orthopedic physical therapy clinic over nine weeks. The patient was a 47-year-old female with a 23-year history of intermittent headaches following a motor vehicle collision. Baseline pain was 7 out of 10 during headaches and 4 out of 10 with neck stiffness. Neck Disability Index was 46%. Cervical rotation was limited to 43° right and 38° left, extension to 45°, and deep neck flexor endurance was 21 seconds. Interventions included cervical and thoracic joint mobilization, soft tissue mobilization, dry needling, scapular and shoulder strengthening, postural reeducation, and a progressive home exercise program. After nine weeks, headache frequency decreased from three to four per week to two per week. Headache intensity decreased from 7 to 4 out of 10 and neck pain from 4 to 2 out of 10. Neck Disability Index improved from 46% to 20%. Deep neck flexor endurance improved to 32 seconds. Cervical rotation improved 31° right and 17° left; extension improved 14°. Functional tolerance to computer work and driving increased. Clinically meaningful improvements were observed despite omission of manipulation. A multimodal approach incorporating mobilization, dry needling, and exercise may reduce pain and disability in individuals with chronic cervicogenic headache when manipulation is not desired.

Brett Bergler, Kai Turner, and Tarang Jain

Subject: Health, Nutrition & Clinical Sciences

Breaking Through Pain: A Multimodal Physical Therapy Approach to Chronic Lumbar Radiculopathy

Chronic low back pain (LBP) with radiculopathy is persistent and functionally limiting, particularly in post-surgical patients. Conservative multimodal physical therapy manual therapy, neural mobilization, therapeutic exercise, and postural retraining is recommended to reduce pain and improve function. A 58-year-old active male with intermittent low back and bilateral leg symptoms, worse on the right, and history of L5-S1 disc herniation treated via lumbar laminectomy presented for care. Prior interventions included multiple steroid injections with temporary relief. Comorbidities included hypertension, hyperglycemia, hyperlipidemia, prostate cancer, and thyroiditis. Exam revealed sacral pain, occasional radicular symptoms, positive right straight leg raise, limited lumbar rotation, absent right Achilles reflex, and bilateral hip/knee weakness. A multimodal intervention targeted pain modulation, mobility, motor control, and postural retraining, consistent with guidelines. The patient attended PT twice weekly for eight weeks, receiving lumbar soft tissue mobilization, cupping, instrument assisted techniques, progressive core training, postural retraining, and a structured home exercise program three times weekly. Pain (NPRS) decreased from 6/10 to 2/10, exceeding the minimal clinically important difference. Lumbar mobility and lower extremity strength improved, reflecting meaningful functional gains consistent with neural mobilization and multimodal conservative management literature. A structured multimodal conservative PT approach may reduce pain and improve function in chronic lumbar radiculopathy. Limitations include single subject design and lack of long term follow up. Further research is needed to optimize outcomes in similar populations.

Kayla Berheim and Deanna Dye

Subject: Health, Nutrition & Clinical Sciences

The Importance of Early Rehabilitative Interventions in Multiple Sclerosis: A Single Case Study

Multiple sclerosis (MS) is a prevalent neurological condition that primarily affects balance, strength, sensation, and fatigue. Physical therapists (PTs) play an important role in the active rehabilitation of the physical impairments related to MS. The purpose of this case study is to demonstrate the importance of early physical therapy (PT) intervention in preserving and regaining function in the early stages of MS diagnosis. This case study follows a 66 year old man referred to PT for the management of balance and strength deficits related to multiple sclerosis complicated by neuropathy. He complained of weakness and balance difficulties affecting his occupation and ADLs. We saw the patient for PT treatments for 45 minutes once a week for 5 weeks. Milestones that we measured included reduced errors in balance activities, increased confidence and tolerance in resistance based exercises, and improved outcomes on the Berg Balance Scale (BBS). We utilized a combination of therapeutic exercise and neuromuscular re-education based upon the patient's energy level and progress or needs in each area. We progressed exercises based on the improvements seen across visits and within fatigue tolerance, allowing for some errors to allow for motor learning. We assessed his balance using the BBS. The BBS is a recommended balance measure for neurologic populations and is highly recommended for use in MS. It is also indicative and predictive of fall risk. He moved from being at increased risk of falls to being considered at no increased risk of falls at the 5 week mark of PT treatment. The literature supports balance and resistance based exercises and the BBS for the management and assessment of MS. In conclusion, this case emphasizes the need for early referral to and initiation of PT for MS to maintain and regain function through balance and resistance based exercise.

Sharif Md Yousuf Bhuiyan, S. M. Nasim Uddin, and Rajib Mahamud

Subject: Engineering, Physical & Mathematical Sciences

Direct Numerical Simulation of Laminar Flame Speeds in Laser-Ignited Ammonia and Ammonia–Hydrogen Mixtures

Ammonia is a carbon-free fuel with potential for sustainable energy systems; however, its low reactivity, narrow flammability limits, and slow laminar flame speed (SL) limit practical application. This study investigates laminar flame speeds of ammonia and ammonia–hydrogen mixtures under spark ignition and dual-pulse laser plasma ignition using a quasi-Direct Numerical Simulation (quasi-DNS) framework coupled with detailed chemical kinetics (Stagni-2025 mechanism). Simulations were conducted over equivalence ratios ϕ = 0.7–1.25 and pressures from 0.1 to 0.5 MPa. Laminar flame speed was determined using a radius-evolution method that accounts for early flame stretch effects. The model was validated against experimental data, predicting peak SL ≈ 6.5–7.0 cm/s for pure ammonia at ϕ ≈ 1.0 and 0.1 MPa, with decreasing

flame speed at elevated pressure (≈5.2 cm/s at 0.5 MPa). Hydrogen enrichment significantly increased SL; mixtures containing 25–40% H_2 exhibited strong flame speed enhancement, while high hydrogen fractions shifted the combustion regime toward greater stretch sensitivity. Damköhler (Da) and Karlovitz (Ka) analyses quantified transitions between reaction-controlled and transport-controlled regimes. Dual-pulse laser plasma ignition substantially increased flame speed compared to spark ignition. For pure ammonia near $\phi \approx 1.05$, SL increased from ~7 cm/s (spark) to ~13–14 cm/s (dual-pulse). Hydrogen-enriched mixtures showed further enhancement, with flame speeds rising sharply as radical production and pre-ionization intensified early kernel growth. Early-time NO and NO_2 predictions indicated reduced NO formation under richer conditions and pressure-dependent sensitivity. The validated quasi-DNS–Cantera framework demonstrates that hydrogen blending and plasma-assisted ignition effectively overcome ammonia's low reactivity. These results support the development of stable, low-carbon combustion systems relevant to advanced propulsion and energy applications.

Sagar Bhusal and Tao Huang

Subject: Engineering, Physical & Mathematical Sciences

Streamflow Trend Analysis and Flood Inundation Modeling: Supporting Restoration of the Fort Hall Bottoms

The Fort Hall Bottoms area, located along the Snake River in southeast Idaho, is a regulated river-floodplain system that is currently going through the process of active restoration planning by ICREWS. The alteration of flow regimes and/or the reduction of peak discharges has likely decreased the frequency of overbank floods, and therefore, limits the connectivity of the floodplain to the river. Accordingly, this study aims to understand how streamflow patterns have changed over time to create an inundation model for use in restoration design. This study evaluates long-term hydrologic trends across Idaho by dividing the state into HUC-8 watersheds and analyzing Annual Maximum (AM) discharge series derived from daily mean flow records at 77 USGS stream gauges. About 30 gauges with long, continuous records (≥50 yrs) were identified for detailed analysis. The Mann–Kendall test is being used to evaluate trends in peak flow magnitude. Flood frequency analysis is done using Log-Pearson Type III distribution to calculate 10, 20, 50, and 100 years peak discharges. Preliminary results show notable spatial variability across the state, with some areas seeing higher peak flows over time and others trending downward. The Snake River near Blackfoot (USGS 13069500) is a good example of the latter —annual peak flows there have dropped by roughly 79 cfs per year over the past five decades, though this decline does not clear the bar for statistical significance ($p = 0.28$). The research will now turn its attention to the Snake River at Fort Hall Bottoms. Screened peak flow records from the primary gauge will be used to define boundary conditions for two-dimensional hydraulic modeling. High-resolution elevation data will drive 2D hydraulic simulations to produce flood inundation maps. Overall, the results will offer regional context and adaptation strategies for changes potentially driven by reservoir regulation, altered snowmelt timing, and climate variability in the western U.S.

Baylee Boring and Alex Bolinger

Subject: Business, Economics & Public Administration

The Threat of Nepotism

Nepotism is defined as favoritism shown to family members in professional settings. Existing research has focused on how family members may benefit from nepotism and the implications of those benefits for organizational fairness and outcomes. However, researchers have not systematically examined situations in which leaders attempt to avoid favoritism and unintentionally disadvantage family members. This study introduces the concept of "nepotism threat," defined as the preemptive fear that family relationships will be perceived by third parties as favoritism, even when no special treatment is intended. We propose that when leaders experience nepotism threat, they are more likely to engage in overcompensating behaviors that may place family members at a professional disadvantage. This study explores two questions: (1) Does nepotism threat actually exist? (2) If so, how does it shape organizational decision making and family members' experiences? Given the nascency of this phenomenon, I have adopted an inductive qualitative approach drawing on two distinct data sources. Study 1 explores nepotism threat in the television series Blue Bloods. Based on the experiences of former members of the New York Police Department and praised by current law enforcement professionals for its accuracy, the series provides behind-the-scenes insight into how a police commissioner navigates pressures that hinder career outcomes of his otherwise qualified family members. Study 2 examines whether nepotism threat exists beyond fictional

depictions. I will conduct a series of open-ended interviews with individuals who have worked with or for family members and with individuals who have not. These interviews compare beneficiary and outsider perceptions to assess how nepotism threat is experienced and interpreted in real organizational contexts. This work challenges the assumption that nepotism uniformly benefits family members and may unintentionally disadvantage those closest to leaders.

Devin Braaksma, Ryan Hall, Jill Harris, Deanna Dye, and Ankur Padhye

Subject: Health, Nutrition & Clinical Sciences

Early Restoration of Functional Capacity in Subacute Stroke Within Home Health: A Single Case Study

Following stroke, diminished functional capacity limits tolerance for higher intensity rehabilitation. Restoration of activity tolerance during the subacute phase may build readiness for more demanding intervention. The purpose of this case study was to illustrate how restoration of functional capacity in the home health setting can serve as a foundational phase of rehabilitation to support progression to higher intensity interventions. The patient moved from acute & skilled nursing care to home health over an 8-week episode, extended 2 weeks after a fall. Examination included the Two-Minute Walk Test (2MWT) to assess functional capacity, Timed Up & Go (TUG) for mobility, & 30-Second Chair Stand Test (30CST) for lower extremity strength. Clinical impression identified diminished endurance, weakness, & balance deficits. Intervention consisted of functional endurance training delivered bi-weekly for four weeks then once weekly, including ambulation, marching, stair negotiation, and uneven surface training. Intensity was monitored using vital signs & Rate of Perceived Exertion. Activities were progressed & modified following a fall to reinforce safety. At discharge, 2MWT improved from 86 to 185ft, TUG improved from 38 to 29s, & 30CST improved from 3 to 7 reps. Improvements exceeded minimal detectable change for TUG & 30CST, & approached minimal clinically important difference (MCID) for 2MWT. Descriptive analysis showed meaningful functional gains. Patient was discharged to a home program with residual fall risk. Long-term follow-up was unavailable, clinical instructor communication was required for discharge data, & variable MCID values limit interpretation. Restoration of functional capacity during the subacute phase may build physiologic reserve & support progression to more intensive rehabilitation. Prioritizing endurance in home health may serve a critical first phase of recovery when activity tolerance limits advancement.

Jillian Brown and James Ralphs

Subject: Health, Nutrition & Clinical Sciences

Parkinson's Disease Impact on Early Mobility Following Total Knee Arthroplasty: A Single Case Report

Early mobility after total knee arthroplasty (TKA) is typically predictable. However, Parkinson's Disease (PD) can affect postoperative mobility and recovery. Physical therapists must differentiate between typical postoperative limitations and motor impairments from PD to provide safe progression and appropriate discharge planning. This case highlights the impact of PD on early TKA mobility and the clinical reasoning needed to ensure effective physical rehabilitation in an acute care setting. A 68-year-old male with diagnosed PD underwent an elective TKA. Prior to surgery, he reported being mostly independent with activities of daily living. On postoperative day (POD) 1, he demonstrated shuffling gait, decreased step length, bradykinesia, postural instability, and difficulty managing a front-wheeled walker. He required frequent cueing and up to moderate assistance for bed mobility, transfers, and ambulation. Parkinson's medication and pain medication timing were optimized and showed no meaningful improvement in mobility. By POD 2, functional mobility declined further, requiring increased assistance for mobility and difficulty ambulating short distances safely. Although the plan of care followed standard post-operative TKA protocol and medication timing was optimized, functional mobility declined from POD 1 to POD 2. The patient did not meet expected early TKA milestones. Discussion: This case demonstrates that PD motor impairments can significantly limit early postoperative mobility following TKA and the typical protocol was insufficient for this patient's needs. Functional decline despite medication timing suggests a neurologic contribution beyond typical postoperative limitations. Physical therapists in an acute care setting should anticipate deviation from the typical TKA protocol in patients with PD, use effective clinical reasoning, and adjust plan of care and discharge planning to account for neurologic impairments in this population.

Rachel Brown and Cynthia Blanton

Subject: Health, Nutrition & Clinical Sciences

Assessing Nutrition Education and Counseling in Health Science Graduate Students and Practitioners

Nutrition plays a critical role in disease prevention and management, yet many healthcare professionals report inadequate preparation to provide nutrition counseling. While physicians' nutrition education has been extensively studied, limited research examines nutrition training among other healthcare professionals. This investigation sought to evaluate the level of nutrition-related training reported by students and practitioners in nursing, pharmacy, physical therapy, and physician assistant programs. A literature review was conducted using the Academy of Nutrition and Dietetics' Evidence Analysis Library process to examine nutrition education among healthcare professionals and its impact on clinical competency and referral practices. Inclusion criteria included studies published within the last five years, focused on adult populations, involving healthcare professionals other than dietitians, and published in English. Initial database searches yielded 456 records. After review, 8 articles were included in the final analysis. Results showed a consistent pattern of inadequate nutrition education across healthcare professions. Nurse practitioner students received an average of 14.4 hours of nutrition content. Pharmacists demonstrated limited confidence in nutrition knowledge and counseling. Physician assistants reported 59% dissatisfaction with nutrition curricula. Healthcare providers with formal nutrition education were more likely to provide nutrition advice, yet referred patients to Registered Dietitian Nutritionists infrequently. Current literature demonstrates that healthcare professionals outside of dietetics receive insufficient nutrition education during their training programs, resulting in limited knowledge and confidence in providing nutrition care. These findings highlight the need for enhanced nutrition curricula in health science programs.

Ella Bunde, Kyla Johnston, Jeremy Hernandez, Lauren Owens, and Caryn Evilia

Subject: Biological & Natural Sciences

Improving extremophile identification: A metagenomic-style approach to developing archaeal-specific 16S primers

Metagenomic methods and DNA sequencing are powerful tools for determining what organisms are present in the environment. With the amplification and sequencing of DNA encoding small-subunit ribosomal RNA (16S and 18S rRNA), many species, as well as the relative abundances of organisms in an environment, can be identified through computational analysis and DNA databases. However, current primer sets were developed and optimized to identify Bacteria and Eukarya from relatively mild growth conditions using the V4 and V9 variable regions in the rRNA gene, respectively. Unfortunately, these primers tend to yield nonspecific or limited PCR products from extremophile and archaeal DNA, leading to these organisms being misidentified or underrepresented in environmental samples using current bioinformatic methods. Analysis of extreme environments requires better, more specific primer sets that efficiently amplify G-C-rich DNA found in extremophiles, such as halophilic Archaea. Through computational analysis supported by experimentation, several primer sets with high specificity for the archaeal 16S rRNA gene were developed to screen for Archaea commonly missed with traditional V4 and V9 primer sets. Initial testing via fragment analysis confirmed that our designed primer sets produced more consistent PCR products in Archaea than the standard V4 and V9 primer sets. In addition, these primers show limited or different-sized products in bacterial and eukaryotic DNA samples. Our metagenomic-style analysis shows significant differences in taxonomic data when using our designed primers compared to standard primer sets. These differences include more specific taxonomic data for Archaea, more accurate relative amounts of Archaea, and correct identification of Archaea missed by V4 and V9 primers. Our analysis with the suggested primer sets will allow us and others to more effectively characterize extreme environments, like the Great Salt Lake, and more efficiently and specifically identify Archaeal organisms in environmental samples.

David Burnett and Julia Martin

Subject: Biological & Natural Sciences

The novel NRAMP-type transporter in pneumococcus is repressed during iron replete growth

Manganese, iron, and other transition metals have emerged as important trace nutrients in bacterial physiology. During an infection, bacteria must acquire these metals for survival from the host environment for use as enzyme cofactors in many metabolic processes. Although metals are essential for survival, their accumulation can be toxic. This duality has forced bacteria to evolve selection strategies that maintain optimum intracellular metal levels by sensing, acquiring, storing or,

when needed, exporting metals properly. The impact of metal availability on pathogenesis is particularly exemplified by the human respiratory pathogen Streptococcus pneumoniae. This bacterium typically asymptomatically colonizes the nasopharynx but can also cause life-threatening invasive infections such as pneumonia, septicemia, and meningitis. Research has shown that manganese acquisition is important for S. pneumoniae pathogenesis. Deletion of genes encoding manganese-transporters leads to decreased virulence in model infections. The role of manganese and its potential interplay with iron metabolism remains unclear in this bacterial pathogen. Using bioinformatics, gene deletion, and expression tests we identified a Streptococcus conserved bacterial manganese resistance factor MntH (spd_0161). The predicted structure suggests that MntH is an NRAMP-type transporter, although it does lacks the conserved amino acid DPGN motif required for exporting manganese. Using a FLAG-tagged MntH, we show that MntH protein expression is repressed during iron replete growth; manganese and other metals do not significantly alter its expression. This work begins to establish the function of MntH in S. pneumoniae as putative transporter involved in iron homeostasis and potential interplay with manganese.

Weston Burrup, Emma Hammer, Evan Taylor, and Zachary Warnock

Subject: Education, Learning & Training

The Role of Prenatal Maternal Education in Increasing Newborn Visits

Health literacy remains a significant barrier to timely newborn care in the United States. Prior studies show that although most newborns are evaluated shortly after birth, infants born to mothers with lower educational attainment are at higher risk of missing recommended routine care. Even modest gaps in follow-up represent hundreds of thousands of newborns annually who do not receive essential screenings. Universal health-literacy precautions, including simple, low-reading-level educational materials, may improve care utilization. Providing a bilingual (English and Spanish) handout outlining recommended newborn and well-child care (WCC) visits during third-trimester prenatal care increases attendance at newborn and subsequent WCC visits. Billable births and completed newborn WCC visits were tracked at three clinics from October 1, 2025, to February 6, 2026. The study included a preintervention period (October 1–November 17), a first intervention period following handout distribution (November 18–December 15), and a final intervention period after workflow improvements to ensure consistent handout delivery (December 16–February 6). A total of 53 deliveries occurred during the study period, with 37 newborns attending at least one WCC visit. WCC attendance was 77.2% during the preintervention period, 46.2% during the first intervention period, and 77.8% during the final intervention period. Review of clinic workflows revealed that handouts were not reliably distributed until the final intervention period. When the preintervention and first intervention periods were combined, attendance was 65.7%. Despite a small sample size and multiple confounders, results suggest that early prenatal education using a simple bilingual handout may improve newborn WCC attendance. Incorporating standardized prenatal education into routine care may help address health-literacy barriers and improve newborn follow-up.

Alyson Bybee, Steve Oswald, and Tarang Jain

Subject: Health, Nutrition & Clinical Sciences

Milestone-Based Early Protected Loading After Percutaneous Achilles Repair: A Case Study

Recent systematic reviews and randomized trials support early functional rehabilitation and weight bearing within the first 1–4 postoperative weeks after Achilles tendon repair without a clear increase in rerupture risk compared to immobilization. However, progression rate may influence tendon elongation and long-term symmetry, particularly after minimally invasive or percutaneous repair. Despite growing support for early loading, many protocols remain time driven rather than milestone based. The purpose of this case study was to describe a symptom-guided, milestone-based protected loading strategy initiated one week after percutaneous Achilles repair and examine its effect on time to independent ambulation.An active adult male was evaluated one week status post percutaneous Achilles repair.No surgeon-specific protocol was provided, so the clinic followed a progressive rehabilitation framework. The patient ambulated with bilateral crutches in a controlled ankle motion boot. Impairments included DF AROM 10° (PROM 12°), PF 45°, Inv 40°, Ev 10°, PF strength 4-/5, mild edema, scar restriction, and pain 2/10 at rest (4/10 worst).Functional limitations were significant (LEFS 21/80, SANE 20%, PSFS walking and standing 2/10, stairs 1/10).Four visits occurred between postoperative weeks 1–3, emphasizing edema control, protected mobility, intrinsic activation, talocrural mobilization, scar management, and progressive weight bearing guided by incision healing, swelling response, gait quality, and symptom tolerance. A structured home program reinforced controlled loading twice daily.Crutches were discontinued at week 3, with independent ambulation in the boot and no complications or

rerupture concerns. Isometric testing showed loading capacity despite asymmetry, and Global Rating of Change was +4.This case supports milestone-based protected loading after percutaneous repair, suggesting early progression may safely restore ambulation while preserving repair integrity safely.

Yvette Cadeaux

Subject: Education, Learning & Training

Remote Reflections: A Qualitative Study Exploring Retrospective Perceptions of Emergency Remote Instruction in Secondary School and Their Influence on Postsecondary Education Decisions

This qualitative study examined the perceptions of young adults who participated in emergency remote instruction in Spring 2020. The study explored how perceptions of emergency remote instruction during the COVID-19 school closures shaped post-secondary education decisions. The study sample was composed of individuals 18 and older, who experienced remote instruction during the COVID-19 pandemic school closures and who were enrolled in grades 7-12 while attending a traditional public school in the United States. Study participants were interviewed using semi-structured questions informed by the Community of Inquiry (CoI) theoretical framework. This framework emphasizes social presence, cognitive presence, and teacher presence as important elements in a computer-based learning environment. This theoretical framework was selected as it contains constructs that can be applied to a variety of online delivery environments and is not dependent on technological advances, such as video conferencing or high-speed internet, since CoI pre-dated such innovations. The study participants engaged in two Zoom interviews that focused on their experiences and perceptions of emergency remote instruction in Spring 2020 as well their postsecondary education experiences. The first interview was based on the semi-structured open-ended interview questions; the follow-up interview functioned as a participant validation check and gave participants the opportunity to clarify and provide context to the answers recorded in the initial interviews. Using the narrative inquiry research methodology and thematic analysis, the study explored themes such as teacher support, the creation of community in a virtual environment, and relevance of assignments. Findings suggested there was a prevalence of busy work, lax grading methods, and minimal school communication during this period of emergency instruction. The rich and authentic data gleaned from the study will provide valuable insights to educators, administrators and designers of instruction at both the K-12 and postsecondary level.

Marcos Cantu

Subject: Education, Learning & Training

Engaging the Youth: Introduction to Cyber-Physical Systems

There is a significant workforce and knowledge gap between information technology (IT) cybersecurity and operational technology (OT). This gap has resulted in a shortage of professionals capable of securing cyber-physical systems. Existing educational pathways often introduce these domains separately and too late. As a result, students are limited in their ability to develop integrated expertise. Prior research shows that early engagement is critical for students to develop an interest in technical career fields. This paper presents the design and implementation of a hands-on, project-based learning model aimed at introducing high school students to cyber-physical systems. The model utilizes a Raspberry Pi to run a Hot Wheels track paired with an integrated curriculum to teach foundational IT and OT concepts in a single environment. The proposed model is cost-effective, scalable, and offers an engaging method for bridging the gap between theoretical knowledge and practical application. By introducing these concepts earlier in the educational pipeline, it will contribute to a more prepared and capable workforce addressing critical infrastructure challenges.

Katelyn Cathcart, Joshua Swift, Eliana Claps, Jacob Bingham, Cordell Stover, Emma Standley, and Mayley Johnson

Subject: Humanities, Behavioral & Social Sciences

A Meta-Analysis of Client Preferences for Distance versus In-Person Delivery of Psychotherapy

In recent years, there has been a significant increase in the use of distance-delivery forms of psychotherapy. While distance-delivery options have become more accepted and widely used, there remains a limited understanding of client preferences regarding these delivery methods. In this current meta-analysis, we aimed to synthesize the literature directly comparing client preferences for in-person versus distance-delivery formats. Methods: In total, 37 articles—comprising data

from 20,124 participants—met all inclusion criteria and were included in the meta-analysis. Results: Across 44 preference comparisons drawn from the 37 studies, participants showed a strong overall preference for in-person psychotherapy, with approximately 75% favoring in-person delivery over distance-based modalities. Substantial heterogeneity in preferences between studies was observed, and moderator analysis revealed systematic patterns—preference for in-person services increased with age and rural residence, but decreased with higher education, prior telehealth experience, publication year, and higher proportions of female and white participants. Discussion: These findings underscore the need for mental health systems to evaluate resource allocation and service delivery, ensuring that investments continue for in-person services, aligning with client preferences and supporting patient-centered care.

Arifa Islam Champa, Md Fazle Rabbi, Farjana Eishita, and Minhaz Zibran

Subject: Education, Learning & Training

The Role of Psychological Phishing Categories and Feedback-Driven Learning in Phishing Detection

Phishing attacks remain a major cybersecurity threat despite continued advances in automated detection systems. Because phishing exploits human psychology to steal sensitive information, users remain a critical line of defense, highlighting the need for effective education and training. In this study, we investigate how phishing detection differs across categories of psychological manipulation and how feedback-driven learning influences users' ability to detect phishing emails. We classify phishing emails into five categories based on established behavioral and psychological frameworks reported in prior literature. We then conduct a user study with 55 participants involving two sequential email identification tasks. In the first task, participants classify 10 emails without receiving feedback. After completing this task, participants receive explanatory feedback that highlights key indicators of phishing. Participants then complete a second task with 10 new emails, which allows us to assess learning gains and changes in detection performance across categories. The results reveal meaningful differences in both baseline performance, with an overall accuracy of approximately 56%, and learning outcomes, with accuracy increasing to 70% after receiving feedback. Participants show higher initial accuracy for phishing emails that rely on social pressure or implied social proof. In contrast, emotionally manipulative and deceptive emails are more difficult to detect initially but show notable improvement after receiving feedback. These findings indicate that feedback-driven learning improves phishing detection, although its effectiveness varies by phishing category. This study highlights the importance of category-specific training and feedback in phishing education. The results inform the design of targeted cybersecurity awareness programs and training interventions that strengthen users' ability to recognize and respond to deceptive online communications.

Eric Christen, Erika Stewart, Joshua Grinith, and Anirban Chakraborty

Subject: Biological & Natural Sciences

Impact of Soil Amendments Targeting Roadside Revegetation on Soil Microbial Communities

Invasive plant species are a major threat to roadside ecosystems. To manage invasive plants, land management agencies often utilize soil amendments to revegetate native plant species. Commonly used soil amendments may have direct and indirect effects on resident soil microbial communities when applied individually and in combination with each other, yet these indirect effects remain underexplored. In this study, we investigated the indirect effects of applications of a commercial microbial inoculant, both alone and in combination with a non-synthetic micronutrient fertilizer or a wool-pellet-based fertilizer. Soil amendment applications were conducted at three experimental sites situated along the sides of a major interstate highway spanning the eastern corridor of Idaho, USA; with each site located within a distinct Level IV EPA ecoregion. Soil samples were collected annually across sites during three consecutive summers post-application for assessing soil chemical properties and to conduct DNA-based microbial community surveillance. The sites were found to host significantly different microbial communities while no noticeable community dissimilarity within samples representing individual or combinations of soil amendments were observed. However, specific genus-level clades became differentially abundant in samples treated with different soil amendments, such as Janthinobacterium, a common soil bacterium known for producing bio-active metabolites. Correlation analyses of soil chemical properties with differentially abundant taxa further revealed pH and organic matter as principal drivers of shifts in taxa abundance. Our results showed that a single application of combinations of soil amendments for land management purposes triggered taxon-level responses to treatments, even if a community-level response was not exhibited.

Eliana Claps, Joshua Swift, Jacob Bingham, Kate Cathcart, Angelina Conrow, and Mayley Johnson

Subject: Humanities, Behavioral & Social Sciences

Engagement in and Attitudes Toward Artificial Intelligence Use Among Psychotherapy Researchers

Artificial Intelligence (AI) research and use have skyrocketed in recent years, changing the way business, education, and research are conducted (Bharadiya et al., 2023; Chubb et al., 2022). However, the implications of AI use and best practices are closely tied to the context of the field in which AI is used (Bankins & Formosa, 2023; Fiske et al., 2019). Considering this, the present study sought to determine engagement in and attitudes toward AI use in psychotherapy research. Reports from self-identified psychotherapy researchers (N = 128) revealed that 88.28% disclosed having used AI, and 61.72% reported using it at least weekly. Roughly a third to half of the sample reported personally using AI to make it easier to review literature (35.94%), code (35.16%), correct grammar (47.66%), and professionally communicate (42.19%), but few reported using AI to write a portion of their manuscript (14.84%), and fewer reported citing AI use in a manuscript (6.25%). Across all AI practices, more participants reported knowing a colleague who engaged in these practices than those who reported personal use. Psychotherapy researchers' prevalence estimates of AI use in the field and its ethicality varied widely across the sample; however, the sample tended to agree that citing AI use was more ethical (M = 5.27, SD = 1.23) and using AI to write portions of a manuscript was less ethical (M = 3.04, SD = 1.21). These results indicate that psychotherapy research is indeed subject to AI influence, but there are differences in how AI is used and perceived. The implications of these findings and AI considerations for psychotherapy research moving forward will be discussed.

Stephanie Coddens, Ali Hendrickson, and Ankur Padhye

Subject: Health, Nutrition & Clinical Sciences

Blood Flow Restriction Training Following Distal Triceps Tendon Repair: A Case-Based Approach to Clinical Decision-Making

Distal triceps tendon rupture is a rare injury with limited rehabilitation-specific guidelines, particularly for patients seeking return to high-demand activities. Blood flow restriction (BFR) training promotes strength and hypertrophy using low external loads, yet its role following distal triceps tendon repair remains underexplored. The purpose of this case study was to highlight the clinical decision-making and outcomes associated with incorporating BFR as an adjunct to postoperative rehabilitation following distal triceps tendon repair. A 47-year-old male underwent surgical repair of a left distal triceps tendon rupture sustained during a CrossFit muscle-up. Initial evaluation revealed postoperative pain, difficulty with overhead tasks, reduced grip strength (60 lb involved vs 120 lb uninvolved), and a QuickDASH score of 49.0. Rehabilitation was delivered in an outpatient orthopedic setting over 22 weeks with early interventions briefly focused on pain and edema management, protected elbow range of motion, and proximal activation within brace and surgical precautions. BFR was introduced after adequate surgical site healing using a proximal upper-extremity cuff at approximately 50% limb occlusion pressure (LOP). Progressive limb loading exercises were performed with BFR at low-loads (20–30% estimated 1RM). At discharge, the QuickDASH improved to 4.5, representing a 44.5-point improvement exceeding the minimal clinically important difference and reflecting a transition from moderate disability to minimal limitation. Full elbow extension (0°), 135° flexion, and improved strength symmetry supported return to high-demand recreational activity. This case suggests BFR may serve as a clinically meaningful adjunct when high-load strengthening is restricted following distal triceps tendon repair. The magnitude of improvement aligns with proposed mechanisms of low-load metabolic stress supporting strength recovery while respecting tendon healing. Further research is needed to determine broader applicability of BFR in postoperative upper-extremity tendon rehabilitation.

Michelle Collier

Subject: Business, Economics & Public Administration

Bridging the Training Gap in Rural 911 Dispatch Agencies: A Public Administration Study

Rural 911 dispatch centers play a critical role in emergency response but often face unique challenges in accessing consistent and high-quality training opportunities compared to their urban counterparts. Limited funding, staffing shortages, and geographic isolation can restrict professional development and contribute to stress and burnout among dispatch personnel. This study examines the training needs and gaps experienced by dispatchers working in rural agencies, with a focus on identifying barriers to effective skill development. Data collection will include semi-structured interviews with

current dispatchers in Idaho, as well as survey responses from dispatch personnel. This data will be analyzed to identify common themes related to training availability, perceived preparedness, and areas where additional support or resources are needed. In addition, existing training policies and materials from selected dispatch centers will be reviewed to better understand current training practices. Preliminary findings are expected to highlight key gaps in training access, content, and delivery methods for rural dispatchers. The results will provide insight into priority areas for improvement and may inform the future development of targeted, cost-effective training resources designed to better support rural emergency communication professionals.

Caitlyn Cronce, and Deanna Dye

Subject: Health, Nutrition & Clinical Sciences

Physical Therapy-Led Differential Diagnosis of Lumbar Spinal Stenosis in a Post-Stroke Patient: A Single Case Study

Older adults with history of cerebrovascular accident (CVA) frequently present to the acute inpatient setting with complex medical comorbidities and baseline neurologic impairments that can obscure new or evolving pathology. Lumbar spinal stenosis may present with progressive, activity-dependent lower-extremity (LE) pain and gait dysfunction that can mimic or coexist with post-stroke motor impairments, further complicating differential diagnosis in acute physical therapy care. The purpose of this case study is to examine the clinical presentation and evolving neurologic signs of a hospitalized patient following a fall, with emphasis on differentiating between post-stroke deficits, lumbar central stenosis, post-operative recovery, and stroke recrudescence to guide referral and management. An 87-year-old male was admitted for an acute L4 compression fracture after falling. History included ischemic CVA 1.5 months prior. At evaluation, he reported moderate pain at rest and severe pain with mobility, requiring moderate assistance for transfers. LE strength was bilaterally strong without myotomal weakness, and neurologic screening was unremarkable. Gait with an assistive device was pain-limiting and progressively worsened, prompting ongoing differential diagnosis. During the first week, gait tolerance declined with the development of scissoring gait, increased unilateral tone, asymmetric reflexes, and urinary incontinence, prompting medical referral. Imaging revealed severe lumbar spinal stenosis requiring decompression. Post-operatively, reflexes normalized and neurologic status improved; however, ambulation remained pain-limited. Overlapping central and peripheral features created diagnostic ambiguity, as activity-dependent LE pain was consistent with neurogenic claudication, while recurrence of stroke-related gait patterns aligned with post-stroke recrudescence. Post-operatively, neurologic improvement preceded small functional gains, consistent with recovery patterns in older adults with comorbidities. In conclusion, this case illustrates the importance of ongoing neurologic reassessment by the physical therapist, which was critical in distinguishing spinal pathology from prior stroke deficits and facilitating timely intervention.

Nelly Cyuzuza, Aaliyah Tovar, and Shaun Stosich

Subject: Biological & Natural Sciences

Identifying the molecular targets of Masp1 protein during embryonic development

3MC syndrome is a genetic disorder caused by mutations in the Mannose-Binding Lectin-Associated Serine Protease 1 (MASP1) gene. Patients present with abnormal craniofacial phenotypes such as cleft lip, as well as intellectual disabilities. Masp1 is a secreted protease whose known molecular role in immune defense pathways involves protecting the body against infectious pathogens. However, its functions in pathways important for early development remain unknown. To investigate this, our lab uses African clawed frog embryos as a model organism to study the role of Masp1 during early development because they share similar developmental mechanisms with humans. Previously, we found that disrupting Masp1 levels through overexpression and knockdown experiments impacts craniofacial and neural cell populations by regulating ectodermal patterning. To investigate the underlying mechanism, we disrupted Masp1 levels in the embryonic dorsal marginal zone, where it is expressed. This disruption resulted in altered dorsal-ventral axis patterning. These patterning processes are regulated by a signaling gradient involving the secreted morphogen Bmp4 and its negative regulators, chordin and noggin. To determine whether these morphogens are influenced by Masp1, we performed in situ hybridization. We found that disruption of Masp1 altered the expression patterns of chordin and noggin during gastrulation. These results suggest that Masp1 plays an essential role in regulating Bmp4 signaling, possibly by interacting and cleaving proteins involved in this pathway. However, the specific proteins cleaved by Masp1 during early development remain unknown. To address this, I am performing western blot and co-immunoprecipitation to detect and isolate Masp1-protein

complexes, with the goal of performing Tandem Mass Spectrometry to identify proteins that bind to Masp1. This study will provide new insights into the role of MASP1 during early development and its link to patient phenotypes.

Breanna Danklefsen and Bryan Arroyo

Subject: Health, Nutrition & Clinical Sciences

Physical Therapy Management of Eustachian Tube Dysfunction - Associated Ear Pressure: A Single Case Study

This case report describes the clinical presentation and outcomes of a patient with persistent auditory symptoms following ear infection that did not resolve with medical management for presumed Eustachian tube dysfunction. Emerging evidence suggests cervical and temporomandibular impairments may influence auditory perception in individuals with persistent otologic complaints. This case outlines the examination findings and outcomes of targeted physical therapy intervention in a patient presenting with hollow auditory sensation. The patient developed daily hollow auditory perception, jaw popping, and stress related posterior cervical headaches after an ear infection. Symptoms persisted for five months despite intranasal corticosteroid use and worsened during stress. Cervical range of motion was within normal limits and neurologic screening was unremarkable. Examination revealed hypermobility of the left temporomandibular joint, decreased upper cervical mobility, tenderness of the lateral pterygoid and masticatory musculature, and forward head posture. The patient completed nineteen visits over twelve weeks. Treatment included manual therapy to the temporomandibular and upper cervical regions, intraoral lateral pterygoid release, progressive deep cervical strengthening, and dry needling following plateau in symptom reduction. By visit nine, symptoms transitioned from daily to intermittent. During the final three weeks of care, the patient entered a structured independent management trial to assess symptom stability prior to discharge.At discharge, the patient reported 95 percent improvement, absence of hollow auditory days during the final three weeks, resolution of jaw popping, reduced headache frequency, improved function at work, normalized joint mobility, and improved posture. Targeted physical therapy may benefit individuals with persistent otologic symptoms when medical management alone is insufficient and musculoskeletal contributors are identified. Limitations include reliance on patient reported outcomes and absence of objective audiologic reassessment. Further research is warranted to better understand the relationship between cervical, temporomandibular, and auditory symptoms.

Sina Dehestani, Biwash Ghimire, and Ali Habashi

Subject: Biological & Natural Sciences

Mas Signaling: A Novel Anti-Proliferative Strategy in Cancer Cells

Angiotensin 1-7 (Ang 1-7) is a prominent effector peptide of the protective axis of renin angiotensin system (RAS) which includes Angiotensin converting enzyme 2 (ACE2), Ang 1-7 and Mas receptor (MasR). This receptor's downregulation is positively related with progression in specific cancers. In this study we evaluate the expression of Mas receptor in different cell lines and test agonistic activation of this receptor in cell proliferation using Ang 1-7. For evaluating the role of MasR, first we used immunofluorescent imaging via MasR primary antibody and Alexa fluor 488 secondary antibodies to identify these receptors on the cells. For this purpose, A549 (lung adenocarcinoma) cells in wildtype (WT) and Mas knock-out (KO) form was used. Then, similar experiment was done on MDA-MB-231 cells to identify MasR in breast cancer cells. The cell lines were treated with Ang 1-7 peptide for 72h to evaluate the anti-proliferation effects of this receptor, specifically to compare WT with KO type in A549 cells. We used immunofluorescent imaging; there was a significant increase in fluorescence intensity of WT compared to KO form of A549 cell lines in plate reader confirming absence on MasR. Visible fluorescence intensity was seen on MDA-MB-231 cells suggesting the expression of Mas receptor on breast cancer cells. Cell viability assay using Ang 1-7, showed significant decrease in viability rate of WT form whereas KO cells showed no decrease. Moreover, significant decrease was seen in MDA-MB-231 cell viability compared to healthy breast cancer cells. Mas receptor plays an important role in cell proliferation and migration. Elimination or downregulation of this receptor leads to progression of cancer in lung adenocarcinoma and breast cancers.

Sina Dehestani, and Ali Habashi

Subject: Health, Nutrition & Clinical Sciences

Dual-Targeting Lipid Nanoparticles Improve Bone Tropism and Anti-Tumor Efficacy in Metastatic TNBC

Breast cancer, particularly when metastasized to bone, remains a major public health concern. Angiotensin 1-7 (Ang 1-7) activates the MAS-1 receptor in breast cancer cells, influencing tumor growth and lymph node metastasis to bone. Triple-negative breast cancer (TNBC), an aggressive subtype of invasive ductal carcinoma (IDC), expresses MAS-1 receptors. However, targeted delivery strategies for Ang 1-7 remain underexplored. This study evaluated dual-decorated lipid nanoparticles (LNPs) encapsulating Ang 1-7 to enhance targeting and therapeutic efficacy in TNBC cell lines (4T1 and MDA-MB-231). Ang 1-7-loaded LNPs were fabricated using a microfluidic NanoAssemblr platform. Lipids functionalized with RGD and alendronic acid (10 mg/mL in ethanol) formed the organic phase, while Ang 1-7 (1 mg/mL in PBS) comprised the aqueous phase. The two phases were combined via controlled microfluidic mixing. Formulations were dialyzed and characterized for particle size, polydispersity index (PDI), zeta potential, encapsulation efficiency (HPLC), and morphology (TEM). Bone-targeting capability was assessed using a hydroxyapatite binding assay. Cytotoxic efficacy and targeting were evaluated in 4T1 and MDA-MB-231 cells using the MT-Glo assay. Stability was monitored for 30 days at varying temperatures. Decorated LNPs exhibited a mean size of 122.94 ± 2.65 nm, PDI of 0.114 ± 0.04, and zeta potential of −1.19 ± 0.49 mV. Encapsulation efficiency reached 62.22%. TEM confirmed uniform nanoparticle formation. Hydroxyapatite assays demonstrated enhanced bone-binding capacity. In vitro studies showed significantly greater anti-tumor effects compared to non-decorated LNPs. The formulation remained stable for 30 days and up to 40 °C. Dual-functionalized LNPs improve active tumor targeting, bone affinity, and therapeutic efficacy. These findings support their potential for treating bone-metastatic TNBC.

Aubree Denker

Subject: Health, Nutrition & Clinical Sciences

Own Your Voice: Advancing Consent, Violence Prevention, and Sexual Health Among Female Collegiate Athletes

Female collegiate athletes face elevated risk for sexual and gender-based violence, yet prevention efforts often remain compliance-driven. This project asks: How can an athlete-centered education program strengthen consent communication, bystander readiness, and help-seeking among female collegiate athletes? To address this question, Own Your Voice (OYV) was developed to address this gap through an athlete-centered curriculum designed specifically for female collegiate athletes. OYV is a workshop series, developed with support of ISU Athletics and Title IX. Using social learning theory and self-efficacy frameworks, the curriculum integrates consent education, healthy relationship skills, sexual violence awareness, bystander intervention training, and resource navigation. Development included a literature review and interviews with athletes. Evaluation included comprehensive pre/post surveys incorporating validated instruments, including the Sexual Consent Self-Efficacy Scale, Bystander Efficacy Scale, and General Help-Seeking Questionnaire, as well as session-specific knowledge checks. Pilot implementation findings demonstrate measurable improvements. After one 60-minute workshop, participants reported a 13% average increase in confidence in setting boundaries; a 10% average increase in healthy relationship skill confidence; and a 3% average increase in consent confidence. Qualitative data found that participants reported feelings of satisfaction with the delivery of content and described the environment as interactive and athlete-centered. These findings suggest that athlete-centered, skill-based education can strengthen consent communication, bystander readiness, and help-seeking confidence among female collegiate athletes. This curriculum promotes a shift beyond compliance to foster a culture of empowerment, respect, and prevention within collegiate athletics. If effective, the curriculum will be adaptable and scalable for future campus-wide implementation.

Antora Dev, Yidong Xia, and Mostafa M. Fouda

Subject: Engineering, Physical & Mathematical Sciences

Seeing Inside Torrefied Biomass: How 3D X-ray CT images and AI Reveal Its True Quality

Biomass feedstocks are vital for biofuel production but often suffer from poor flowability and inconsistent quality. High inorganic content and complex porosity in torrefied biomass can lead to clogging and slagging, making detailed characterization crucial. This study emphasizes advanced identification and analysis of torrefied biomass powders to better evaluate quality and prevent handling problems. Micro-Computed Tomography (μ-CT) was used to create 3D images of

torrefied biomass powders, which were analyzed with a U-Net–based deep learning segmentation pipeline trained with a patch size of 64, batch size of 16, and the Adadelta optimizer. Segmentation was refined from binary and then a 4-class model into a 5-class model to differentiate inter-particle and intra-particle porosity, retrained with extra annotations to improve boundary accuracy. Surface area-to-volume (SA: V) ratios were calculated using Euclidean distance transforms, with lower ratios indicating compact, high-quality biomass and higher ratios indicating contamination and increased reactivity. The retrained 5-class model achieved high accuracy with a low validation loss of 0.066, effectively capturing the complex microstructure. Results showed 39.44% biomass and 2.73% inorganic contaminants, with porosity mainly composed of inter-particle voids (51.26%) and intra-particle porosity (6.57%). Analysis indicated that high SA: V ratios and contamination are linked to lower-quality biomass, while spherical particles with low SA: V ratios signify higher quality. This research demonstrates that ML-based segmentation allows precise analysis of porosity and contaminants, improving the assessment of torrefied biomass quality for efficient bioenergy production.

Sophia Diffin, Chris Seagraves, and Ankur Padhye

Subject: Health, Nutrition & Clinical Sciences

Conservative Management of Posterior Cruciate Ligament: A Case Report

Injuries to the Posterior Cruciate Ligament (PCL) are extremely rare and often seen in males. For every PCL injury there are 35 Anterior Cruciate Ligament (ACL) injuries. As a result, clinical practice guidelines for ACL management are abundant and focus on building strength in the surrounding structures to compensate for the lack of ligamentous stability. Whereas, clinical practice guidelines for conservative management of PCL injuries are missing. This case focuses on a comprehensive conservative management program for a PCL injury. In this case, a 66 year old female with a right PCL complained of difficulty with kneeling, getting in and out of bed, instability, weakness, and pain. The patient presented with a Lower Extremity Functional Scale (LEFs) score of 42/80, indicating 58% of maximum knee function. The plan of care focused on restoring symmetrical quadricep strength with Long Arc Quad exercises, functional knee stability with lateral weight shifting, and restoring functional mobility patterns to address her functional limitations with exercise participation for 2-3x a week. At 4 weeks, her plan of care progressed to include bike, calf stretch, straight leg raise, single leg stance balance on foam pad, and knee extension machine. At 10 weeks, the patient performed hamstring curls independently and was discharged 2 weeks later with a Home Exercise Program (HEP) that included many of the exercises she performed in the clinic. Over these 14 weeks, the patient improved LEFs to a score of 49/80. Similar progress was observed in Manual Muscle Testing (MMT) and R knee Range of Motion (ROM). This case conveys that isolated PCL injuries in older adult females can respond well to conservative management as seen in the LEFs scores and provides a structured, strength focused rehabilitation program to compensate for lacking ligamentous instability and to improve functional mobility.

Jaclyn Doehler, Melody Weaver, and Lisa Hardy

Subject: Health, Nutrition & Clinical Sciences

A diabetes video education for k-12 school personnel

Type one diabetes (T1D) is an intricate autoimmune disease requiring continuous monitoring, coordinated support and timely intervention to ensure safety and high life quality. In school settings legally the coordination of T1D care falls to staff members such as teachers, secretaries, counselors and principals. Children spend the majority of their life in school settings. However, understanding and management of diabetes care tasks of T1D is variable among staff.The variability leads to potentially inconsistent care and increased risk for acute complications such as hypoglycemia or hyperglycemia. Easily accessible standardized education resources are imperative to promote safe evidence based medical practices among school personnel. The purpose of the Poster Presentation is to show the design and development of a concise, evidence based video education series. The video series consists of nine videos distilled from nineteen slide decks from the American Diabetes Association's Safe at School training series. The goal of the series is to educate K-12 school staff regarding T1D management. The series is grounded in national guidelines including the American Diabetes Safe at School training series, and evidence-based adult learning theories to enhance engagement, retention and reduce cognitive overload. The video series is being made to be easily used, scalable and sustainable. This project aims to enhance diabetes related care within K-12 schools across Idaho overall improving safety for students with T1D and enhancing ease of compliance for schools with the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973.

Erin Donahue, Michele Hutter, Jacob Chesler, Chantal van Ginkel, and Curtis Billings

Subject: Health, Nutrition & Clinical Sciences

How do hearing aids benefit first-time users?

Hearing aids are a primary treatment for hearing loss; however, 20% of hearing aid users are dissatisfied with their devices. Additionally, benefit may change over time following hearing aid fitting. Our purpose was to determine how adults with hearing loss perceived the impacts of their hearing aids over time. Benefit was determined using prospective pre- and post-hearing-aid-fitting data of older adult first-time hearing aid users (n=50+ individuals). User experience was quantified by subjective self-report using the Glasgow Hearing Aid Benefit Profile (GHABP). Subjects were tested up to one-year post-fitting across multiple visits with the goal of identifying immediate and long-term effects of amplification on self-report outcome measures. Preliminary results found that self-reported disability was immediately reduced following hearing aid fitting. The results found by the use, handicap, and benefit subscales of the GHABP will also be discussed, as well as long-term change in comparison with immediate effects. Hearing aids immediately benefit first-time adult users, as evidenced by the reduction in disability score on the GHABP post-fitting. Variability in benefit and predictors of the degree of hearing aid benefit will be discussed further.

Saugat Dotel, Taha Ahmed, Mustafa Mashal, Mahesh Acharya, Mohammad Hany Yassin

Subject: Engineering, Physical & Mathematical Sciences

Performance Evaluation of Flax Fiber Reinforced Concrete Pavements with Glass Fiber Dowels

The growing demand for low-carbon and sustainable infrastructure has intensified research into natural fiber reinforced concrete as a means of improving mechanical performance while reducing environmental impact. This study examines the feasibility of flax fiber reinforced concrete pavements incorporating Glass Fiber Reinforced Polymer (GFRP) dowels as a durable and environmentally responsible alternative to conventional pavement systems. Surface-treated natural flax fibers were introduced as partial replacements for cement (by weight) and fine aggregates (by volume) at replacement levels of 0.5% and 1%. Cement replacement resulted in a moderate reduction in compressive strength, while improving flexural strength. To evaluate load transfer behavior, steel dowels (31.75 mm [1.25 in.]) and GFRP dowels with diameters of 25.5 mm (1 in.), 30 mm (1.18 in.), and 38 mm (1.5 in.) were investigated in both conventional and flax fiber reinforced concrete. Experimental pull-out and load deflection tests were conducted to assess dowel–concrete bond performance.

Morgan Duplanty, and Deanna Dye

Subject: Health, Nutrition & Clinical Sciences

Case Report: Addressing Fear Avoidance in Low Back Pain Through Functional Strengthening And Patient Education

Low back pain is a leading cause of disability worldwide and is further influenced by fear avoidance, pain catastrophizing, and psychosocial factors such as anxiety and depression. These contribute to activity limitation, work absence, and maladaptive pain beliefs. Current literature supports patient education and graded exposure as effective strategies to reduce disability and improve function. The purpose of this case study is to illustrate how addressing fear avoidance and pain-related beliefs through education and graded functional training improved activity tolerance and self-efficacy in a young adult with low back pain. This case study occurred in an outpatient orthopedic physical therapy clinic over eight weeks. The patient was a 23-year-old male who left his job as a grocery store merchandiser due to low back pain that began after repetitive lifting at work. Medical history included anxiety, depression, and sedentary lifestyle. He reported left hip pain and bilateral lumbar pain radiating into the left lower extremity with occasional numbness. Outcome measures included the numerical pain scale and Oswestry Disability Index. Examination revealed a lateral lumbar shift, lumbar paraspinal tenderness, limited hip mobility and hamstring length, and guarded lumbar movement. Neurological screening was unremarkable. Interventions, provided twice weekly for five weeks then weekly for three weeks, included core stabilization, lifting mechanics training, postural reeducation, mobility exercises, and education targeting fear avoidance. Progressions were based on symptom response and tolerance. Outcomes included the resolution of radiating symptoms, and decreased hesitancy and pain with lumbar motion. Improvements with numerical pain scale and Oswestry Disability Index score. Lifting mechanics and postural awareness improved, and the patient became independent with his home program. In conclusion, this case highlights the value of combining functional rehabilitation with education to address psychosocial contributors to low back pain. Overall, meaningful functional and behavioral improvements supported return-to-work readiness.

Julia Duran, Juergen Riedelsheimer, Cordell Stover, Aubrey Fuchs, and Robert Rieske

Subject: Humanities, Behavioral & Social Sciences

Looking at Brain Activity in Autism: A Review of EEG Mirror Neuron System Research

Researchers use EEG to measure brain activity and understand how people think, move, and interact with others. In Autism research, they look at how the brain's responses to actions might explain some features of Autism Spectrum Disorder (ASD). One idea, known as the "broken mirror" theory, suggests that autistic individuals may show reduced activity in the mirror neuron system (MNS)—a network of brain cells that responds both when we perform an action and when we watch someone else do it. This systematic review examined 23 studies of MNS responses in autistic children and adults, as well as in people from the general population who show higher levels of autistic traits. Thirteen studies found differences in MNS patterns between autistic and non-autistic participants, while ten found none. Results were especially mixed in studies involving children and in studies based on autistic traits. In contrast, studies with adults showed more consistent differences, suggesting that age may play an important role. Some studies linked unusual MNS patterns to difficulties with imitation or communication, while others found typical brain responses even when participants struggled with the task. This raises questions about whether the MNS truly reflects social understanding or action processing. Overall, the evidence does not strongly support the broken mirror theory. Instead, the findings highlight the diversity of autistic experiences and brain patterns. More consistent research methods and more flexible theories will be important for understanding what the MNS can—and cannot—tell us about autism.

Anwar Hossain Efat and Farjana Z. Eishita

Subject: Education, Learning & Training

Cross-Platform GUI Design for Gamified Virtual Exposure Therapy: A Usability Study

Germophobia/Mysophobia, or the fear of germs, is a prevalent anxiety disorder that significantly impacts daily life. This study details the development and preliminary usability study of a serious game designed as a Virtual Reality Exposure Therapy (VRET) tool for germophobia. The primary goal was to investigate the impact of a specific Graphical User Interface (GUI) element—a Minimap navigational aid—on user performance across two distinct platforms: PC and Android mobile. A within-subjects, counterbalanced experiment with N=12 participants was conducted. Results indicate a significant learning effect, with completion times improving across all groups in the second run. More importantly, the study revealed a platform-specific trade-off: while the Minimap was highly preferred on PC, mobile users reported that the map consumed excessive screen real estate, negatively impacting the user experience. This suggests that GUI design in mobile VRET applications must prioritize an unobtrusive interface to avoid distracting from the core therapeutic content.

Rhys Ellis and Anirban Chakraborty

Subject: Biological & Natural Sciences

Ecophysiology of Dormant Bacterial Endospores in Seafloor Sediments Impacted by Continuous Emission of Warm Fluids from Deep Oceanic Crusts

Dormant endospores of thermophilic bacteria are abundant within the deep subsurface and have also been detected globally throughout the cold seabed. Distribution patterns of these subsurface bacteria may be explained by a dispersal history originating in warm subsurface habitats, e.g., the deep crustal biosphere. The Juan de Fuca ridge, located off the coast of the Pacific Northwest, presents an accessible crustal system with multiple sampling observatories permanently drilled into underlying crusts. To assess the potential of endospore dispersal originating from warm ocean crusts, we examined endospore distribution in seafloor sediments near a non-operational sampling platform (U1301A), located on the eastern flank of the Juan de Fuca ridge, where a consistent discharge of warm crustal fluids into the surrounding water column has been observed for almost two decades. 25-cm-deep sediment cores were collected by ROV Jason from three sites near U1301A along a transect moving away from the borehole. Cores were also collected from a nearby operational, non-leaking borehole (U1362B). Endospore germination in pasteurized surface sediments was stimulated by combining sediments with artificial seawater medium amended with sulfate and a mix of volatile fatty acids (VFAs), followed by anoxic incubations at 50 and 65℃ for six weeks. Sulfate and VFA depletion patterns in subsamples collected at different time points indicated activity of germinated endospores, while community analyses using 16S rRNA gene amplicon sequencing showed noticeable variation in endospore communities at different coring sites. Additionally, we observed distinct endospore lineages associated with specific incubation temperatures within sediments from the same sediment core.

Lauren Elmore

Subject: Creative Works

Somnambulist

"Somnambulist" is a creative nonfiction short story from a larger memoir anthology entitled, "Incepto Ne Desistam: May I Not Shrink From My Purpose." This work depicts the lived experience of posttraumatic stress disorder (PTSD) through a fragmented, sensory-driven account of insomnia, dissociation, hyperarousal, and self-harm. Moving between waking and nightmare, the story navigates the aftermath of sexual harassment and assault. Night becomes both threat and refuge: darkness whispers safety even as it incubates intrusive memories. Imagery—disembodied hands, crawling fingers, multiple watching gazes—expresses flashbacks common in trauma. The paralysis in moments of violation contrasts with later compulsive reenactments in which she can speak, push back, or bleed—attempts to reclaim agency in a body that feels simultaneously stuck and unreal. Substance use, overmedication, starvation, overexertion, and cutting emerge not as spectacle but as desperate strategies to regulate intolerable affect and erase the sensory imprint of touch. Ultimately, the work asks what happens when trauma inhabits the seams between memory and doubt, and how survival behaviors—often pathologized—function as efforts to endure. Artist Statement: As a clinical psychology doctoral candidate in the ISU Psychology program who has provided therapeutic services to many individuals with PTSD, I am intimately familiar with the diagnostic frameworks that organize trauma into symptoms. Yet in clinical rooms, I repeatedly witness changes that exceed those categories: a fractured sense of self, moral injury, and shame for the very behaviors that keep someone alive. I aim to challenge the assumption that "just say no" is simple and to illuminate the adaptive logic beneath dissociation, substance use, and self-harm. My work seeks to hold compassion for survivors while inviting clinicians and readers alike to look beyond criteria and into the lived complexity of trauma.

Lauren Elmore and Sarah Emert

Subject: Humanities, Behavioral & Social Sciences

The Impact of Chronic Pain on Delay Discounting: An Examination of Temporal Decision-Making

Chronic pain is a growing public health crisis. Despite its prevalence, current treatments often fail due to limited motivation to engage in behavioral protocols. Pain functions as an aversive stimulus that promotes fear-based avoidance of activity, which may temporarily reduce pain but ultimately contributes to physical deconditioning, disability, and pain persistence. These patterns are linked to neuromotivational systems, particularly heightened activation of the behavioral inhibition system (BIS), which supports avoidance, and reduced behavioral activation system (BAS) activity, which has been associated with engagement, goal-directed behavior, and improved functioning in chronic pain populations. Delay discounting, a behavioral-economic measure of preference for immediate versus delayed rewards, provides a complementary framework for understanding motivation and health-related decision making; however, pain-specific delay discounting remains understudied. To date, no studies have jointly examined BIS/BAS functioning and pain-specific delay discounting as mechanisms underlying treatment disengagement in individuals with chronic pain. The proposed study addresses this gap by comparing chronic pain and non-chronic pain groups on these variables. We hypothesize that individuals with chronic pain will more steeply discount, that is, value smaller, sooner rewards, in this case, pain reductions, as opposed to individuals without chronic pain. In tandem, we hypothesize that chronic pain populations will exhibit greater BIS activation than those without chronic pain. Participants will be recruited through Prolific Academic, an online research platform that facilitates access to diverse, non-student adult populations in the United States. Two hundred and seventy-six participants (138 with chronic pain and 138 without) will be recruited and will then complete surveys on pain disability and intensity, mood and personality-related questionnaires, and pain-specific delay discounting questionnaires. Findings from this study may inform refinement of chronic pain treatment by identifying motivational targets that increase engagement in behavioral activities.

Scot Erickson, Charles Peterson, Ken Aho, and Jericho Whiting

Subject: Biological & Natural Sciences

Daytime Oviposition and Embryonic Development of the Great Basin Spadefoot in Idaho, USA

The Great Basin Spadefoot (Spea intermontana) is a species of conservation concern in the Western US and in Canada and the early development of this species is not well documented. Spadefoots are anurans that estivate underground in desert and dry biomes. Spadefoots only come to the surface to reproduce and feed, which limits opportunities to study the species.

Egin Lakes on the Upper Snake River Plain in Idaho presents a unique opportunity to study the early development of spadefoots in the field because spadefoots resurface for breeding each spring. We surveyed for spadefoot egg masses during spring 2022-2025. During those surveys, we opportunistically observed a rare daytime breeding pair in amplexus and documented their breeding. The pair oviposited 762 eggs in 26 clutches. Each clutch had a mean size of 29 eggs (SD = 15.5, range = 2–80 eggs) which were adhered to bulrushes (Schoenoplectus spp.). Each day, we took images of one of those egg masses, and seven other freshly oviposited egg masses. Furthermore, we recorded the depth of egg masses from the surface, water depth, and water temperature, pH, and conductivity. Embryos hatched from their capsules in a mean of 5.2 days (SD = 0.8, range = 4–6 days). Neither daytime oviposition nor embryonic development of Great Basin spadefoots have been previously documented in the field. These novel life history details and aid biologists developing land-use policies, such as decisions concerning recreation in breeding areas during the spring.

Scot Erickson, Ken Aho, and Jericho Whiting

Subject: Biological & Natural Sciences

Moose Rub Selection and Behavior Along the South Fork of the Snake River

Moose (Alces alces) scent-marking behaviors during the rut are well documented, though selection of trees to rub in the southern portion of their North American range is unknown. Research concerning behaviors (and scent marking) at rub trees is also not well documented. During February 2024 and 2025, we surveyed for rub trees along riparian habitat on public land along the South Fork of the Snake River in Idaho, USA. A mean of 4 (SD = 2.1, range = 2–7) people walked along transects spaced 50 m apart at a pace of 1.1 km per hour while scanning up to 25 m on either side of the transects for rubs. We placed motion-sensor cameras facing nineteen of the rubs we found, and documented behavior at those sites for Fall 2024-2025. Koopman selection ratios indicated a significant selection for juniper as rubs, and 93% of all rubbed trees were on junipers (Juniperus spp.). Among junipers, moose selected those with a moderate diameter at breast height ($p \leq 0.0001$). While monitoring of moose behavior at rubs is still ongoing, we are starting to notice temporal trends. Moose do not seem to avoid areas with high human presence at least 5 locations. Although, increased recreation and development near public lands increase human-wildlife interactions in the Western United States. These results are important for managers to consider when making land-management decisions in these areas, especially concerning pinyon-juniper management.

Gavin FitzGerald

Subject: Health, Nutrition & Clinical Sciences

Social Media Use and Restrictive Diet Trend Adoption Among Male College Students

Restrictive diet trends such as ketogenic, carnivore, intermittent fasting, and other “clean eating” patterns are increasingly normalized within digital spaces. Although social media has been linked to body dissatisfaction and disordered eating risk, most research focuses on female or mixed-gender samples and emphasizes body image rather than specific dietary behaviors. Male college students remain understudied despite growing evidence that men experience pressures related to leanness, muscularity, and performance. This study examines the association between total social media use and restrictive diet trend adoption among male college students. This cross-sectional study will recruit male students aged 18–30 years from a university population. Participants will complete an anonymous online survey assessing average daily total social media use and history of restrictive diet trend adoption, including keto, paleo, carnivore, vegan, intermittent fasting, and similar patterns. Descriptive statistics will summarize usage and diet behaviors. Regression analyses will evaluate whether greater total daily social media use is associated with increased likelihood and number of restrictive diets adopted.
A PRISMA-guided literature review identified six eligible studies examining social media and eating-related outcomes in male or young adult populations. Few assessed restrictive diet trends as behavioral outcomes, and most relied on platform-specific exposure rather than total use. It is hypothesized that greater total social media use will be positively associated with restrictive diet trend adoption. Findings may inform dietetic practice and campus health interventions by identifying socially normalized restrictive behaviors among men and supporting prevention strategies that promote sustainable nutrition practices.

Candice Flowers

Subject: Humanities, Behavioral & Social Sciences

Unearthing Elite Deathways: Sex, Power, and the Complexity of Maya Grave Goods from Core to Periphery

Previous research (Welsh 1987; Chase and Chase 2017; Becker 1986; Ichikawa n.d.; Schwake 2010) has shown that Maya grave goods become increasingly complex and varied as socio-political structures grow more stratified. This suggests that higher-status individuals are more likely to be buried with grave goods, and that elites would have more diverse assemblages. This project investigates whether elite adult males have more varied grave goods than elite adult females, and whether individuals buried in site cores have more varied assemblages than those in peripheral areas. It also examines whether distance from the site core affects mortuary practices and the types of grave goods present in lower-level elite burials (Novotny 2016; Novotny et al. 2018; Molica-Lazzaro 2024; Chase and Chase 2011; Scherer 2015). The study will focus on burials from the Late Classic period (600–900 CE) at the sites of Xunantunich, Cahal Pech, Baking Pot, and Caracol, as well as their associated peripheries. A target sample size of at least 50 burials will be analyzed, focusing on grave goods, age, and biological sex. Data will be drawn from previously published site reports, theses, dissertations, and scholarly articles. The combination of using grave goods, spatial relationship, and legacy data is unique and being used in such a way to identify wealth distribution not done before. This research expects to find that elite adult males possess more varied grave goods than their female counterparts and that burials within site cores contain more diverse assemblages than those at peripheral sites which will contain fewer and less varied grave goods. These findings will contribute to the broader understanding of Maya wealth distribution and mortuary practice, incorporating biological, geographical, and chemical perspectives to offer new insights into elite status expression like never before.

Ciara Gaches and Samuel Peer

Subject: Humanities, Behavioral & Social Sciences

Multi-Modal Validation of the Psychosocial Strengths Inventory for Children and Adolescents (PSICA): Concordance between Caregiver-Report and Behavioral Observation

With over 40 years of research, Parent-Child Interaction Therapy (PCIT) is a best practice, transdiagnostic treatment for youth ages 2–6. One core component of PCIT is assessment-guided treatment, which includes the weekly administration of the Eyberg Child Behavior Inventory (ECBI), a caregiver rating scale of child disruptive behavior. Recently, PCIT approved the Psychosocial Strengths Inventory for Children and Adolescents (PSICA) as a free, strength-based alternative to the standard, but costly ECBI. Although growing studies evince numerous psychometrics of the PSICA (e.g., test-retest and inter-rater reliability; construct, criterion, known-groups, and structural validity; treatment sensitivity), no prior study has tested the PSICA's multi-modal validity, particularly comparing PSICA caregiver-ratings with behavioral observations. To bridge this gap, this study examined pre-treatment assessment data from 40 PCIT-presenting youth (Mage = 5.2, SD = 1.9; 55% boys, 45% girls; 71% White, 16% Black, 13% Latino/a). Data included caregiver-ratings on the ECBI (Intensity: M = 152.2, SD = 29.9) and PSICA (Frequency: M = 151.9, SD = 26.3), as well as standard behavioral observations coded with the Dyadic Parent-Child Interaction Coding System (DPCIS-IV). Overall child compliance to caregiver commands (as a percentage) was computed by aggregating child compliance across 10 total minutes of standardized parent-led play and clean-up conditions (M = 41.8%, SD = 28.6%). As predicted, PSICA Compliance Scale scores correlated positively with DPICS-coded compliance to a large, significant ($r = .49$, $p = .008$); whereas the ECBI Frequency-DPICS association was negative but small and nonsignificant ($r = -.12$, $p = .30$). These findings are the first to demonstrate that the PSICA's caregiver ratings significantly align with objective observations, and further support the PSICA's psychometrics and clinical utility for strengths-based assessment during youth-focused behavioral treatments.

Ciara Gaches and Samuel Peer

Subject: Humanities, Behavioral & Social Sciences

Parent-Child Interaction Therapy–Middle Childhood (PCIT-MC): Pilot Trial Evaluation of Developmentally Adapted Treatment Modules

Conduct problems are among the most frequent mental health referrals for youth and, if left untreated, lead to harmful developmental cascades. Parent-Child Interaction Therapy (PCIT) is a best practice treatment for child conduct problems, with two main treatment phases: (1) Child-Directed Interaction (CDI), which teaches social reinforcement and attachment

skills, and (2) Parent-Directed Interaction (PDI), which focuses on safe, effective discipline via a time-out procedure. Although PCIT has been well-established for children ages 2–6, many youth do not receive treatment until later, when standard PCIT–and specifically its PDI phase–may be infeasible and/or developmentally inappropriate. In response, a developmentally adapted protocol for youth ages 7–12, PCIT for Middle Childhood (PCIT-MC), was created by developmentally tailoring CDI and more significantly adapting PDI (i.e., replacing the standard time-out procedure with Token Economy and Response Cost subphases). A recently completed pilot trial of PCIT-MC involving 13 treated youth (Mage = 9.4, SD = 1.3; 78.6% boys) and their caregivers (61.5% biological mothers) has produced promising results, but this is the first study to specifically examine the incremental utility of PCIT-MC's phases–and specifically its PDI subphases. Repeated measures ANOVA results indicated that child disruptive behavior significantly decreased pre- to post-treatment to a large degree (ηp^2 = .69, p < .001), with significant, large improvements in both CDI (d = 0.91, p = .003) and PDI (d = 0.99, p = .001). Notably, there were small but nonsignificant reductions in disruptive behavior during PDI's Token Economy subphase (d = 0.29, p = .15), but significant, large reductions in its Response Cost subphase (d = 1.05, p = .003). These findings further support PCIT MC's overall efficacy as a treatment for conduct problems in middle childhood, while also providing novel evidence of its adapted components' incremental utility.

Abinash Gautam, Abiral Tiwari, Mustafa Mashal, and Jared Cantrell

Subject: Engineering, Physical & Mathematical Sciences

Evaluation of Industrial By-Products as Supplementary Cementitious Materials in Concrete

Globally, the building sector is responsible for 11% of all carbon dioxide (CO_2) emissions, primarily through the production of Portland cement. During the production process, large amounts of waste and byproducts containing radionuclides, organic contaminants, and hazardous metals are generated by power plants and the manufacturing sector. When these substances seep into the soil, they have detrimental effects on the ecosystem, such as groundwater and soil pollution. When disposed of in landfills, these contaminations pose health concerns related to pulmonary diseases. Using these leftovers in the construction industry to partially replace cement in concrete mixes for various engineering projects is a sustainable alternative. When utilized as a supplementary cementitious material, these components have potential pozzolanic activity because they contain calcium, potassium, magnesium, and silica. This study explores the valorization of byproducts from western US regions in concrete mixes by performing chemical analyses and mechanical tests on modified concrete mixes. The materials being examined include glass pozzolana (GPO), sugar industry-derived precipitated calcium carbonate (PCC A & PCC B), 316L stainless steel powder (mostly composed of nickel, manganese, and molybdenum), biomass wood ash (BWA), coke dust, and coke fines. Chemical analysis will be carried out through Scanning Electron Microscopy (SEM), X-ray diffraction (XRD), and X-ray fluorescence (XRF) to investigate oxide composition, mineral phases, and microstructural evolution. The 28-day compressive strength will be determined by replacing cement with byproducts from 5% to 50%. So far, both BWA and GPO have surpassed the 4000-psi benchmark at 5%, 10%, and 15% replacement, with peak strength at 10%. The chemical analysis will correlate and explain the achieved mechanical performance. Overall, the study will demonstrate great promise by incorporating these byproducts as a sustainable cement replacement, reducing virgin material consumption, minimizing landfill disposal, and advancing environmentally responsible construction practices.

Biwash Ghimire, Pradeep Giri, Sina Dehestani, and Ali Aghazadeh-Habashi

Subject: Biological & Natural Sciences

Formulation, characterization and Pharmacokinetic study of a novel lipid nanoparticle formulation of bisphosphonate conjugated Angiotensin 1-7

The renin-angiotensin system (RAS) regulates cardiovascular and renal homeostasis via two pathways: the classical axis (Ang II/AT1R), which promotes vasoconstriction, and the alternative axis (Ang 1-7/MasR), which counter-regulates these effects. Clinical use of Ang 1-7 is hindered by a short in-vivo half-life [1, 2]. While bisphosphonate conjugation improves stability [2,3], this study evaluates entrapping the conjugate in lipid nanoparticles (LNPs) to further enhance oral pharmacokinetics. Ang 1-7 conjugate was synthesized and entrapped in LNPs (DDAB:DSPC:Chol:DSPE-PEG; 5:1:3.7:0.3) using a microfluidic NanoAssemblr. Particles were characterized via DLS and HPLC. Pharmacokinetics were evaluated in male and female SD rats (n=8/group) following jugular vein cannulation. Plasma concentrations were quantified via LC-MS, and data were analyzed using non-compartmental analysis in Phoenix WinNonlin. LNPs for Ang 1-7 and the conjugate measured 160.72 ± 2.65 nm and 172.98 ± 2.81 nm, respectively, with low polydispersity (PDI < 0.12). Entrapment efficiency was significantly higher for the conjugate (93.45%) compared to the native peptide (36.32%). The formulations demonstrated

high stability in simulated gastric and intestinal fluids. PK data showed a significant increase in half-life and circulation time for the LNP-formulated conjugate compared to the native peptide. Bisphosphonate conjugation combined with LNP entrapment significantly improves the stability and oral bioavailability of Ang 1-7 [3]. This dual-delivery approach offers a promising strategy for enhancing the therapeutic efficacy and ease of administration for peptide-based drugs.

Pradeep Giri, Biwash Ghimire, Sina Dehestani, and Ali A. Habashi

Subject: Biological & Natural Sciences

Novokinin Analogs Synthesis, Formulation, Characterization and Pharmacokinetics/Pharmacodynamics Studies

The classical arm of renin angiotensin system (RAS) consists of angiotensin converting enzyme (ACE) / angiotensin II (Ang II) / angiotensin type 1 receptor (AT1R) which is responsible of various biological functions like pro-inflammatory, proliferative, fibrotic and vasoconstriction actions. On the other hand, the protective arm of RAS consists of angiotensin converting enzyme 2 (ACE2), angiotensin 1-7 (Ang 1-7), Mas receptor (MasR), and angiotensin type 2 receptor (AT2R) which counteracts the effect of classical arm of RAS (1, 2). Therefore, ligands that bind to AT2R and act as an agonist can be used as one of approaches for better therapeutic effect in case of inflammation, cardiovascular disease and for cancer. Peptide based therapeutics hold significant promise in the treatment of various diseases; however, their clinical application is often limited by poor stability, low membrane permeability, and rapid clearance. This project aims to enhance the therapeutic potential of novokinin, a bioactive peptide and AT2R agonist, by chemical modification and delivery using lipid nanoparticle-based delivery system to improve its physiological properties and bioavailability. Novokinin analologs will be synthesized by chemical modification. Lipid nano-particles (LNPs) containing novokinin analologs will be formulated using microfluidic methods, allowing precise control over particle formation and scalability. PK studies will be conducted in healthy Sprague Dawley rats. PD efficacy will be assessed using disease-relevant models to evaluate therapeutic outcomes of each formulation. Chemical modification of novokinin will improve its membrane permeability and pharmacokinetic / pharmacodynamic profile. These studies are expected to demonstrate that chemical modification and LNP encapsulation can serve as effective strategies to enhance its pharmacokinetic and pharmacodynamic properties. The findings may pave the way for the development of more stable, bioavailable, therapeutically effective peptide-based treatment.

Richard Golden

Subject: Humanities, Behavioral & Social Sciences

Preacher or Predator? Reverend Pearson from The Wind That Lays Waste From the Psychoanalytic Lens of the Narcissist

Even though, on the surface, some people seem confident and sure of themselves, frequently it can be seen that reasons and motivations can sometimes be darker and less innocent than we have imagined. In the 2012 novel El Viento Que Arrasa (The Wind That Lays Waste) by Selva Almada, one of only four main characters, the Reverend Pearson, is a savior of souls, single father, strong leader, and a travelling preacher. We meet up with the preacher, and his young, curious, rebellious daughter, with a broken down car in the isolated Argentine countryside. They meet an old agnostic mechanic and his innocent, adopted son, and we see that the preacher has made it a skill to use the innocence of youth and isolation to his advantage. It's almost as if the career was built for the Narcissist. When we examine Reverend Pearson through the lens of the narcissist, and through information from articles about toxic masculinity by Vüsal Alquliyev, Michael Kerrigan, and David Robson, as well as contemporary Argentine novels by Félix Bruzzone and Carlos Busqued, that Pearson fits into that category of narcissist, that he collects his salvations like as some sort of existential conquest, and that, unlike his outward coda of service to God, that he is servicing his narcissistic needs. El Viento Que Arrasa is a story of identity, innocence, isolation, and how a selfish, narcissistic mind always looks for what it craves.

Garrett Hall, Jacob Todd, and Tarang Jain

Subject: Health, Nutrition & Clinical Sciences

Progressive Proprioceptive Neuromuscular Facilitation–Based Dynamic Stabilization for Nonoperative SLAP and Infraspinatus Tears: A Case Report

Combined superior labrum anterior to posterior (SLAP) and rotator cuff tears are frequently managed surgically in young, active individuals with overhead occupational demands. Although proprioceptive neuromuscular facilitation (PNF) has

demonstrated benefit in other shoulder conditions, there remains limited research examining structured conservative management emphasizing dynamic stabilization for combined labral and rotator cuff injuries. A gap exists in the literature regarding the use of multi-planar PNF interventions for these specific pathologies. The purpose of this case report is to describe outcomes following a progressive PNF-based rehabilitation program in a worker with combined SLAP and infraspinatus tears managed nonoperatively. A 29-year-old male delivery driver sustained a work-related left shoulder injury while catching a falling box overhead. Magnetic resonance imaging confirmed a SLAP tear and infraspinatus tear. Initial findings included pain 6 of 10, limited active flexion (138°) and abduction (130°), external rotation weakness (4-/5), and scapular dyskinesis. The patient completed outpatient physical therapy twice weekly for 24 weeks. Early care focused on pain modulation and rotator cuff activation. Mid-phase rehabilitation integrated resisted PNF D1 and D2 patterns, rhythmic stabilization, and alternating isometrics to enhance multi-planar neuromuscular control. Late-phase care emphasized endurance-based, work-simulated overhead tasks. Outcomes included Numeric Pain Rating Scale, goniometry, manual muscle testing, and Disabilities of the Arm, Shoulder and Hand (DASH). Pain decreased to 1 of 10. Flexion improved to 172° and abduction to 170°. External rotation strength improved to 5/5. DASH improved from 52.5 to 12.5, exceeding minimal clinically important difference values. The patient tolerated work-simulated lifting without symptom exacerbation. Progressive PNF-based dynamic stabilization may address neuromuscular and endurance deficits not targeted by isolated strengthening alone. This case supports conservative management incorporating multi-planar stabilization for return-to-work readiness in combined labral and rotator cuff injuries.

Christian Haragos, Jill Harris, Laurel Kramer, and Kelly Adamson

Subject: Health, Nutrition & Clinical Sciences

Effects of Early High Intensity Intervention for Patients with Acute Ischemic Strokes A Case Report

Cerebrovascular accidents remain a major cause of long-term disability, particularly among patients with multiple risk factors. This case is especially relevant because the patient's high lifestyle and medical risk could have been considered potential contraindications to high-intensity intervention. However, with appropriate medical clearance and close monitoring, the patient achieved a near full return to pre-stroke function within eleven days, supporting the potential benefit of high-intensity training in the acute stroke setting. This outcome raises important questions regarding the extent of benefit from high-intensity interventions and highlights the need for further exploration. The patient had significant comorbidities , including hypertension, diabetes, sleep apnea, and chronic tobacco use. The patient suffered an acute ischemic stroke four days prior to admission, as confirmed by Computed Tomography angiogram. Upon admission, the patient demonstrated right-sided weakness, impaired coordination, gait instability with intermittent knee buckling, and decreased endurance. Interventions included gait training, balance training, coordination training, strengthening, muscular endurance, and aerobic training, vital signs were monitored throughout to ensure safety during higher-intensity exercises. All outcome measures used were performed at initial evaluation and right before discharge, each had increased by at least the Minimal Detectable Change for patients with strokes in the span of eleven days, reflecting clinically meaningful improvements and reduced fall risk. Outcome measures included Berg Balance Scale which improved by five points ,Five Times Sit to Stand Test which improved by five seconds, and the timed up and go test, which improved by eight seconds. In conclusion, this case study not only demonstrates the potential for meaningful recovery in the acute phase of stroke but also highlights the need for continued research into the safe and effective application of high-intensity interventions.

Quincy Hardy

Subject: Health, Nutrition & Clinical Sciences

Stakeholder Perceptions of Implementing Postpartum Depression Screening Using the Edinburgh Postnatal Depression Scale During Infant Well-Child Visits in Southeast Idaho

Postpartum depression (PPD) affects approximately 1 in 7 mothers and is associated with impaired maternal–infant bonding and adverse developmental outcomes. Although national organizations recommend routine screening in pediatric settings, implementation remains inconsistent. Limited data exist regarding stakeholder perceptions of pediatric-based PPD screening in Southeast Idaho. Assessing provider readiness and maternal acceptability is essential to support integration. This quality improvement project used a cross-sectional mixed-methods design guided by the RE-AIM framework. Surveys were distributed via Qualtrics to pediatric providers (n=7), OB/GYN and women's health providers (n=5), and pregnant or postpartum mothers (n=41) in Southeast Idaho. Surveys assessed feasibility, collaboration, and acceptability of implementing the Edinburgh Postnatal Depression Scale (EPDS) during well-child visits. The maternal survey included a brief

educational handout with pre- and post-assessments. Data were analyzed descriptively, and qualitative responses were reviewed for themes. All stakeholder groups demonstrated strong support for pediatric-based PPD screening. Pediatric providers reported confidence and readiness, and OB/GYN providers endorsed collaborative referral processes. Mothers expressed willingness to complete screening and accept referrals; concerns regarding stigma, honest responses, and consistent provider dialogue were noted. The educational intervention improved maternal understanding of PPD and help-seeking behaviors. Broad stakeholder support exists for EPDS screening during pediatric well-child visits. Successful implementation requires structured referral pathways, clear communication, and intentional provider–mother engagement. Routine pediatric-based screening may improve early identification and maternal–infant outcomes in rural communities.

Payton Harrell, Tony Book, and Bryan Arroyo

Subject: Health, Nutrition & Clinical Sciences

The Effects of Functional Manual Therapy on Pain and Function in an Adult with Subacromial Pain Syndrome: A Case Study

Exercise therapy is recognized as the primary intervention for subacromial pain syndrome (SAPS). However, with acute injuries, irritability and pain often limits a patient's ability to initiate therapeutic exercise. Functional Manual Therapy (FMT) may offer an effective early intervention by modulating pain, improving mobility, and restoring neuromuscular control. The purpose of this case study was to evaluate the effects of FMT as the primary intervention on pain, participation, and shoulder function in an individual with acute SAPS. This single-patient case study follows a 57-year-old male who sustained a left shoulder injury after a fall from a bicycle four weeks prior to evaluation. He presented with 7/10 pain during shoulder movement, reduced shoulder flexion and abduction active range of motion (AROM) to 90°, strength deficits, impaired motor control, and positive clinical tests consistent with SAPS. Treatment consisted of 8 sessions over five weeks with manual therapy (inferior and posterior glenohumeral mobilizations, soft tissue techniques, and thoracic and rib mobilizations) being used as the primary intervention due to high levels of pain. Exercise therapy was introduced progressively as symptoms and activity tolerance improved. Outcome measures included the Numeric Pain Rating Scale, shoulder ROM, manual muscle testing (MMT), and motor control assessments. At discharge, the patient reported 90% improvement with a decrease in pain to 0/10 for most activities, exceeding the minimal clinically important difference of 2 points, improved shoulder AROM to functional limits, improved strength MMT grades across all motions, and improved functional activities and sleep quality. At six-week follow-up, the patient reported sustained improvements. This case demonstrates clinically meaningful improvements following a primary manual therapy approach in acute SAPS and suggests that early FMT may create a therapeutic window for exercise initiation by reducing pain, improving function, and allowing proper mechanics. Limitations include single-subject design and limited long-term follow-up.

S M Mahedy Hasan, Md Fazle Rabbi, Arifa Islam Champa, and Minhaz Zibran

Subject: Humanities, Behavioral & Social Sciences

Cybersecurity in the Public Eye: Insights from Reddit Users Discussions

Cybersecurity is no longer an issue that only tech-savvy people care about; it is now an issue that an increasing number of everyday online users are currently dealing with. As online systems become an essential part of our daily activities, online security breaches like phishing, ransomware, and scams involving deepfakes have become increasingly prevalent. This raises an important question: How do people understand, discuss, and respond to cybersecurity-related issues in their everyday online interactions? We utilized Reddit API to collect cybersecurity-related discussions from 14 subreddits over a six-year period between 2020 to 2025. Then, we applied BERTopic for topic modeling, VADER for sentiment analysis and pre-trained DistilBERT-based emotion for emotion analysis. These methods allowed us to identify most frequent discussion themes as well as the sentiments (positive, negative, neutral) and emotions (joy, anger, fear, sadness, surprise, love) expressed in the discussions. Moreover, we also performed a temporal analysis to examine how these discussion themes, sentiments, and emotions evolved from 2020 to 2025. The analysis identified 41 major cybersecurity topics; i.e., password security, authentication, ransomware, data privacy, and AI-driven threats. Sentiment analysis showed polarized discussions, with 56.35% positive and 34.31% negative comments. Joy (37.63%) and anger (34.82%) were the most common emotions. Over time, discussions shifted from network security to zero-trust security and AI threats. Chi-Square tests confirmed that changes in sentiment and emotion in each year were statistically significant. This study gives important insights into how people talk about cybersecurity on Reddit. It shows that people's concerns have shifted over time, especially with new issues like AI-driven threats. Understanding these shifts can help create more effective cybersecurity awareness campaigns.

S M Mahedy Hasan, Md Fazle Rabbi, and Minhaz Zibran

Subject: Engineering, Physical & Mathematical Sciences

The Quiet Contributions: Insights into AI-Generated Silent Pull Requests

The rise of AI-assisted software development has reshaped workflows, with developers increasingly relying on automated tools to generate or modify code with minimal human involvement. This shift raises important questions about human-AI collaboration and software quality. A notable outcome is AI-generated silent pull requests (SPRs), which are merged or closed without comments or reviews. In this study, we perform a first empirical study on SPRs to explore their impact on code quality, cyclomatic complexity, and security vulnerabilities. We utilized the AIDev dataset, a subset of 4,762 closed silent pull requests from popular Python repositories was selected for analysis. To measure the impact of these SPRs, we employed tools like Radon for cyclomatic complexity analysis, Pylint for identifying code quality issues, and Semgrep for detecting security vulnerabilities. Our analysis revealed that 59.89% of the SPRs did not affect cyclomatic complexity, while 36.88% increased complexity, and only 3.23% decreased it. Similarly, 30.60% of SPRs introduced more code quality issues, while 9.70% reduced them. When it comes to security vulnerabilities, 98.53% of SPRs did not cause any significant change in vulnerability counts. Interestingly, the impact of accepted and rejected SPRs was quite similar across these metrics, with no clear indication of why certain SPRs were accepted or rejected. We have found that, although SPRs cause a substantial increase in cyclomatic complexity and code quality issues, they are still accepted and merged. However, their impact on the number of security vulnerabilities remains limited. Surprisingly, accepted and rejected SPRs exhibit remarkably similar patterns in terms of their impact on the quantity of complexity issues, other quality issues, and vulnerabilities. This similarity suggests that these criteria alone do not explain why some SPRs are merged while others are rejected.

Rachel Hayes

Subject: Health, Nutrition & Clinical Sciences

HPV Vaccine Perceptions on Facebook: A Qualitative Study

Human papillomavirus (HPV) vaccination is a highly effective preventative measure against HPV-related cancers and infections. HPV is the most prevalent sexually transmitted infection in the United States; however, public discourse surrounding vaccination is highly polarized. This study examined public perceptions of HPV vaccination on Facebook to understand themes and factors that may inform vaccine attitudes and beliefs. A qualitative analysis was conducted using 7 publicly-available Facebook posts and their top public comments. Several cycles of reading and taking notes generated descriptive codes, which were then grouped inductively into broader themes. A total of 70 codes were categorized into 6 themes: mistrust in science and government institutions, concerns about vaccine safety, criticism of anti-vaccine individuals, criticism of the media, advocacy for vaccination, and lack of recommendation from medical providers. Online discourse was contentious, with many comments expressing hostility toward individuals with opposing viewpoints. Discussions about HPV vaccination reflected cultural, ideological, and political divisions in addition to concerns about vaccine safety and effectiveness. Facebook discussions about HPV vaccination are informed by broader social tensions, including politics, religion, and morality. These findings demonstrate the need for culturally competent public health campaigns that address vaccine safety concerns, common misinformation, and verifiable research while acknowledging the social contexts in which vaccine decisions occur.

Cody Hosteen, Andy Goode, and James Ralphs

Subject: Health, Nutrition & Clinical Sciences

Analysis of Patient-Guided Precautions of Post-ACLR Recovery

Anterior cruciate ligament reconstruction (ACLR) is common in adolescent athletes. Postoperative rehabilitation varies widely, particularly with respect to range of motion (ROM), weight-bearing (WB), and bracing. Although traditional protocols emphasize restriction-based progression to protect graft integrity, emerging models support criterion-based advancement guided by symptoms and movement quality. Limited case-level literature describes rehabilitation when no explicit precautions are provided.To describe early rehabilitation and short-term outcomes of a high school athlete following ACLR managed without formal ROM or WB precautions. A high school-age male presented to outpatient physical therapy 12 days following an isolated allograft ACLR. The surgeon encouraged a symptom-guided, criterion-based rehabilitation progression, with no post-operative ROM or WB restrictions provided. At evaluation, the patient wore a locked brace, used bilateral crutches, and demonstrated an antalgic gait with reduced terminal knee extension. His knee ROM was 9-110°, muscle

atrophy was present, and his KOOS-12 score was 66.7%. Week 1 emphasized restoration of extension, quadriceps activation, closed-chain lower extremity exercises, and gait training with weight-bearing as tolerated. Week 2 progressed to brace and crutch discontinuation and higher-level exercises. Progression was guided by pain response, effusion, and movement quality criteria. Over two weeks, the patient discontinued assistive devices, demonstrated significant ROM improvements, normalized gait mechanics, and tolerated progressive open- and closed-chain strengthening without increased pain or swelling. These outcomes were achieved more quickly than typically observed in patients following traditional ACLR protocols. This case suggests that symptom-guided, criterion-based early rehabilitation may be feasible, well-tolerated, and associated with quicker early rehabilitation outcomes in select patients following isolated ACLR.

Rachel Jensen and Kristie Karroum

Subject: Health, Nutrition & Clinical Sciences

DNP Project Proposal: DNP Women's Health Curriculum

Problem Statement: Even though there is always improvement in healthcare education, women's health remains underrepresented in many Doctor of Nursing Practice (DNP) programs (Oni, Allen, & Washington, 2022; Theroux, 2020). Current curricula often have gender-specific content within broader primary care or adult health modules, leading to inconsistent and insufficient coverage of vital women's health topics such as reproductive health, mental health, and chronic conditions in women (Adreak et al., 2024; Temkin et al., 2023). Purpose of the Project: This project aims to develop a four-week asynchronous women's health course for DNP students at Idaho State University that will be implemented Summer 2026. The curriculum will emphasize evidence-based, intersectional care for diverse female populations across the lifespan, grounded in feminist pedagogy and adult learning theory. Brief Methods: A mixed-methods approach will assess needs and evaluate the course's effectiveness. Pre-implementation surveys will be distributed to both patients and providers to identify perceived education gaps. The content will potentially include weekly modules, case studies, expert speakers, and discussion forums. Content will be based on results of the needs assessment. Expected Outcomes: The outcomes of this project will be guided by the results of the needs assessment surveys. The survey data from nurse practitioners (NPs) and women will identify specific gaps in knowledge, confidence, and practice related to women's health. These findings will inform course content and shape projected learning outcomes. Significance: By directly addressing a recognized gap in DNP education, this project has the potential to strengthen DNP education, improve patient care outcomes, and prepare NPs to deliver equitable, gender-responsive care.

Maxwell Ji and Dani Moffit

Subject: Health, Nutrition & Clinical Sciences

Changes to the Infrapatellar Fat Pad After ACL-Reconstruction: A Critically Appraised Topic

The purpose of the anterior cruciate ligament (ACL) reconstruction procedure is to restore joint stability and protect joint health. However, studies continue to demonstrate symptoms of early-onset knee osteoarthritis (OA) in patients as early as 1-year post-operatively. Recently, more interest has been brought to light on the role of the infrapatellar fat pad (IPFP) as a potential mediator of the degenerative processes at the knee. Characteristic changes of the IPFP were examined through ultrasound or magnetic resonance imaging (MRI) to potentially associate its role to knee OA. Participants were those diagnosed with ACL rupture and had subsequent reconstruction. Findings suggest IPFP fibrosis is strongly associated with early OA symptoms, whereas IPFP volume changes have mixed results. Additional research is needed to determine the efficacy of conservative treatment for IPFP fibrosis.

Brenna Johnson

Subject: Health, Nutrition & Clinical Sciences

Alcohol and Nicotine Use Among Collegiate Athletes

Collegiate athletes represent a unique subpopulation of college students facing intensive physical demands and high performance expectations. This study examines the prevalence of alcohol and nicotine use among collegiate athletes and explores how these substances relate to athletic performance, injury occurrence, and mental health. A literature review reveals that while overall use of certain substances has declined in recent years, problematic patterns persist, notably an uptick in nicotine vaping concurrent with a decline in smokeless tobacco and binge drinking rates. Heavy episodic alcohol use in athletes has been linked to impaired next-day performance and elevated injury risk. Nicotine use patterns among

athletes are shifting from traditional smoking toward e-cigarettes, with some studies finding comparable or higher vaping rates in athletes relative to non-athlete peers. An anonymous survey of collegiate athletes (n ≈ 50 to100) is being conducted to quantify substance use frequency, contexts, and motivations, as well as to assess self-reported impacts on performance, recovery, and well-being. Results are pending data collection. It is anticipated that findings will mirror national trends and prior research, highlighting significant associations between substance use and adverse outcomes (e.g., injuries, poor recovery, mental health symptoms). These results will inform athletic trainers and campus health professionals in developing targeted screening, education, and intervention strategies to mitigate substance-related harms and enhance student-athlete health and performance.

Hannah Johnson, Kathryn Swore, Deanna Dye, and Ankur Padhye

Subject: Health, Nutrition & Clinical Sciences

Effectiveness of Pelvic Physical Therapy for Urinary Incontinence in the Presence of Pelvic Organ Prolapse: A Case Report

Pelvic floor dysfunction (PFD) is a common condition among women characterized by symptoms such as urinary incontinence (UI), low back pain, pelvic organ prolapse (POP), and overall pelvic pain. UI is the most commonly treated symptom of PFD, though when it presents concurrently with POP, clinical decision-making regarding interventions may be more complex. The purpose of this case report is to examine the effectiveness of Pelvic Health Physical Therapy (PHPT) interventions targeting UI symptoms in the presence of POP, as emerging evidence indicates its success. An adult female with UI and coexisting POP completed conservative PHPT targeting interventions commonly used for UI. The patient presented with urinary leakage during functional activities, a feeling of heaviness in her bladder, low back pain, and perceived core weakness. Participation limitations included intercourse, exercising, and the ability to care for children. Activity limitations involved sleeping, toileting, and lifting. Examination findings included impaired pelvic floor muscle coordination and strength, deficits in lumbopelvic control, and a grade II POP. Conservative interventions indicated for UI were implemented, including core stabilization, pressure management with breathing techniques, pelvic floor muscle coordination, lumbopelvic strengthening, and manual techniques. Following interventions, the patient reported fewer incidences and reduced severity of urinary leakage during daily activities and decreased pelvic pain. Re-examination showed a reduction to a grade I POP and improved pelvic muscle coordination. This case adds to emerging evidence supporting PHPT as an effective conservative intervention for individuals with UI and POP. It also demonstrates that PHPT interventions commonly used to address UI may be effective in managing individuals with coexisting POP. This highlights the role of PHPT as a first-line, non-surgical intervention for individuals experiencing UI alongside POP.

Mayley Johnson, Jacob Bingham, Kate Cathcart, Eliana Claps, and Angelina Conrow

Subject: Humanities, Behavioral & Social Sciences

Responsible Conduct of Research: Attitudes Towards Authorship, Participant Interaction, and Responsibility in Research Practices

Research practices have important implications for the responsible conduct of research within psychotherapy, particularly in how authorship, honesty, and interaction with participants are addressed. The present study investigated psychotherapy researchers' self-reported behaviors, their knowledge of other psychotherapy researchers' behaviors, and their attitudes toward a range of ethically sensitive research practices. Participants (N = 128) evaluated multiple research practices, such as accepting authorship credit where credit was not due or hiring a third party without giving authorship credit. Preliminary analyses suggest a discrepancy between researchers' personal behaviors and their perceptions of others' behaviors in the field, highlighting a potential ethical vulnerability within psychotherapy research. This study will also examine mediators between attitudes towards these practices and researchers' likelihood of engaging in them.

Sadman Sakib, and Md Akil Khan

Subject: Humanities, Behavioral & Social Sciences

AI at the Ballot: Deepfake Campaigns, Framing, and Voter Engagement - Evidence from South Asia

Generative AI is becoming routine in campaign communication, helping parties scale and stylize messages while raising concerns about trust, disclosure, and democratic accountability (Foos, 2024; Toff & Simon, 2024; Vaccari & Chadwick, 2020). Yet evidence remains limited on how parties openly use AI-labeled synthetic videos in everyday campaigning (Rauchfleisch

et al., 2025; Toff & Simon, 2024). We address this gap with the 2025 Bihar Assembly election. We analyzed AI-labeled videos from the official X accounts of the Bharatiya Janata Party (BJP) and the Indian National Congress (INC) (N = 64; BJP = 19, INC = 45). Videos were coded for topic, time focus (past/present/future), visual type (photorealistic deepfake vs. stylized animation), actors/characters, tone, and engagement (views, likes, reposts, replies). We also purposively selected videos for qualitative thematic analysis (8 BJP; 11 INC) to interpret how time, humor, seriousness, and character strategy operate in AI-labeled persuasion. Descriptively, AI-labeled videos were mostly negative and often used for attack, blame, or corruption messaging rather than development-forward storytelling, though some highlighted benefits (Wack et al., 2025). Both parties relied heavily on photorealistic "realistic deepfake" visuals, showing that disclosure can coexist with high-realism synthetic persuasion. Qualitative themes captured (1) nostalgia/progress across past-present-future, (2) satire via recurring characters, (3) serious attack/blame/corruption stories, and (4) contrasts between realistic figures, animated characters, and recognizable public figures. Overall, overt AI labeling did not automatically shift content toward "positive" campaigning; instead, parties used disclosed AI to scale emotionally charged and adversarial narratives, with implications for disclosure policy and voter interpretation.

Will Kimball

Subject: Engineering, Physical & Mathematical Sciences

From Sulfur Waste to Functional Materials: Inverse Vulcanization for Aqueous and Mechanical Applications

Annually, millions of tons of excess sulfur produced by the petrochemical industry are commonly stored in large, unmanaged stockpiles, raising long-term environmental and logistical concerns. Inverse vulcanization offers a sustainable route to upcycle this abundant byproduct into stable, sulfur-rich polymers with a wide range of emerging applications such as Li-S batteries, IR optics, self-healing materials, and more. In this project, two classes of functional inverse vulcanized materials were synthesized and evaluated. First, a library of 14 water-soluble terpolymers was developed using combinations of charged organic monomers. These materials, which are normally hydrophobic due to their high sulfur content, exhibited significantly enhanced solubility in water. Four polymers surpassed 90% solubility, with one exceeding 99%, demonstrating the potential of these systems for aqueous applications such as heavy metal capture. Additionally, mechanically resilient sulfur composites were synthesized using renewable feedstocks and filled with common low-cost materials such as silica, carbon black, and calcium carbonate. These composites exhibited elastomer-like flexibility, with some achieving over 100% strain before breaking, while retaining solvent resistance and structural stability. Although their tensile strengths were modest, their unusual combination of stretchability and durability positions them as promising candidates for low-cost, flexible materials in chemically aggressive environments. Together, this work expands the functionalities of inverse vulcanization, advancing its applicability in sustainable materials science.

Derek Knight, Bryan Arroyo, and Chad Blair

Subject: Health, Nutrition & Clinical Sciences

Pectoralis Major Tendon Repair Rehabilitation Progression in a Pediatric Athlete: A Single Case Study.

Pectoralis major tears are rare in the general population and nearly unheard of in pediatric patients. The purpose of this study is to add another account of a pectoralis rupture in the pediatric population and highlight that current guidelines may have outdated timelines. This case study follows a 16 year old male football player who experienced a rupture of the pectoralis major and details their surgical recovery, highlighting a specialized rehabilitation timeline. The patient presented with limited ROM, general weakness, decreased ability to complete ADLs, and a DASH score of 31. Mobilizations were used to improve range of motion specifically abduction, flexion and external rotation. IASTM's goal was to breakdown collagen of the scar, increasing tissue mobility. Strengthening was prescribed to decrease the general weakness seen in the area. Progress was tracked using AROM and PROM for shoulder flexion, abduction, and external rotation, ability to complete ADLs without symptoms reported by the patient and general function seen at the clinic. Progression of exercises was dictated by the referring physician, clinical practice guidelines, and patient tolerance to activity. By 9 weeks post-operatively, the patient achieved AROM values (Flexion: 165°, Abduction: 175°, ER: 50°) that closely mirrored the contralateral side. At this time, he was able to functionally return to throwing a football lightly. The patient's recovery outpaced reported guidelines, reaching milestones at 9 weeks that are typically expected at the 12-week mark which is aligning with recent case studies. This case is limited at this time to ROM progression and a partial progression of strength, as the patient is currently in strengthening

and return to sport phase with no outcomes to compare to guidelines at this time. These findings suggest that patients may require accelerated, and personalized rehabilitation plans to address the improving rates of healing.

Amit Koirala, Rosham Sharma, Mustafa Mashal, Jared Cantrell, Justin Brown, and Wenchen Dong

Subject: Engineering, Physical & Mathematical Sciences

Lateral Performance of Veneer Laminated Timber Wall Panel System

Tall mass-timber construction is rapidly increasing worldwide, with modern codes permitting greater heights due to advancements in engineered wood products. Post-tensioned (PT) rocking timber systems have emerged as a promising low-damage seismic solution, offering superior performance, including self-centering capability, that results in minimal residual drift after earthquakes. Given the high stresses induced by PT, this technology is most applicable to timber products with higher strength or larger cross-sectional areas. This research focuses on leveraging the superior strength of the Veneer Laminated Limber (VLT) wall panel to resist high PT forces. Traditionally, high-strength steel bars used in PT systems exhibit several challenges, like limited fire resistance, corrosion, and stress relaxation over time. This study explores an alternative advanced PT bar material aimed at improving durability, ductility, and seismic resilience compared to conventional high-strength steel bars. Special attention is also given to the compression toe region during rocking, where confinement strategies are being evaluated for their effectiveness and feasibility as a retrofitting measure. A comparative study showed that the VLT wall system required significantly shorter wall length than the traditional light-frame shear wall to resist equivalent seismic forces, demonstrating its structural efficiency and space-saving advantage. This study builds on the Modified Monolithic Beam Analogy (MMBA), widely used for designing PT timber wall systems. The expected outcomes include a combination of new PT elements with VLT panels and toe confinement for an enhanced seismic performance offering superior durability and fire resistance compared to a traditional light timber frame shear wall configuration.

Verene Kwong and Deanna Dye

Subject: Health, Nutrition & Clinical Sciences

Possible Implications of GLP-1 Use in a Multimodal Physical Therapy Approach for Cervical Pain: A Single Case Report

Cervical pain is a common musculoskeletal condition that can significantly impair function, work, and quality of life. Individuals with underlying spinal pathology may present with complex movement impairments, muscular weakness, and instability, often requiring a structured, multimodal rehabilitation approach. While physical therapy remains the cornerstone of conservative management, concurrent pharmacologic interventions may influence recovery through both supportive and limiting mechanisms. Glucagon-like peptide-1 (GLP-1) receptor agonists, increasingly prescribed for metabolic conditions, possess potential anti-inflammatory effects but may also contribute to fatigue and reduced lean muscle mass, which can affect rehabilitation tolerance.This case report describes the early physical therapy management of a 46-year-old female with cervical pain, spinal stenosis, and recent initiation of GLP-1 therapy. Examination revealed cervical instability, muscular weakness, and moderate disability on the Neck Disability Index. A multimodal physical therapy program focusing on pain modulation, neuromuscular re-education, therapeutic exercise, and progressive stabilization was implemented. Over time, the patient demonstrated progressive improvements across multiple domains. The patient responded positively to early gentle occipital traction, which facilitated overall participation. Pain intensity decreased, particularly during prolonged sitting and repetitive cervical movements. Cervical range of motion improved in all directions, with reduced symptom provocation. Strength and endurance of stabilizing muscles increased, allowing progression to more challenging strengthening exercises within tolerance. Functional tolerance to sustained sitting and daily activities improved, reflected by a meaningful reduction in Neck Disability Index scores. This case highlights the clinical reasoning and outcomes associated with multimodal physical therapy for a complex cervical presentation and contributes to understanding how concurrent pharmacologic therapies may interact with musculoskeletal rehabilitation. It also emphasizes the role of physical therapists in multifactorial patient education, addressing nutrition, lifestyle, and movement strategies. Further research is needed on GLP-1 therapy's long-term effects on the musculoskeletal system to optimize rehabilitation strategies.

Aspyn Lacey and Brandon Payne

Subject: Humanities, Behavioral & Social Sciences

Perceptions of Interprofessional Collaboration Between Athletic Trainers and Physical Therapists

Interprofessional collaborative practice (IPCP) has been found to improve patient outcomes, job satisfaction and team communication as well as decreasing burnout in health care. Athletic trainers (ATs) and physical therapists (PTs) have similar scopes of practice, education, work settings, and patient populations, which creates a IPCP opportunity for high-level patient-centered care. To examine the perceptions of IPCP between ATs and PTs. Methods: Surveys sent via LinkedIn included demographic questions, Likert-type questions, and open-response questions. Results were analyzed with Chi square and descriptive analysis. No significant statistical associations were found for workplace characteristics, frequency of collaboration, or additional professional training on the perceptions of interprofessional collaborations for either profession. Findings found a general agreement between ATs and PTs in their ability to treat athletes and make return to play decisions. Both professions reported disagreement regarding PTs' understanding of the AT scope of practice and the perceptions of professional respect and bias. These findings identify ongoing barriers experienced by ATs when working in healthcare teams, mirroring other similar studies. The main barrier is the misunderstanding of each other's profession, affecting all other aspects of IPCP. Improving interprofessional education as well as increasing opportunities for IPCP working relationships between ATs and PTs is imperative; this will lead to improved patient outcomes and job satisfaction.

Anatoliy Lawrence

Subject: Business, Economics & Public Administration

Analysis of US Data Privacy Laws and Adoption of GDPA

Within the US, there is a distinct lack of any comprehensive privacy legislation. Instead, the responsibility for creating and enforcing privacy controls and laws is left to individual states. While some select states, such as Utah and California, have enacted privacy regulations, particularly data privacy regulations, this is very much the exception rather than the norm (Lawrence et al., 2025). This lack of regulatory oversight has led to weak privacy and data control protections for consumers. Existing federal laws do not go far enough to protect consumers' rights, whether intentionally or unintentionally, from government data collection practices or private businesses. This paper examines what a one-for-one adoption of the European Union's General Data Protection Regulation would mean for the US in terms of privacy protection, data control, national security, and economic competitiveness/feasibility. Furthermore, this paper provides recommendations for necessary future regulations. The research combines legal analyses of existing US-based privacy statutes and international laws, such as the GDPR, with privacy protection, national security requirements, and economic implications. The analysis draws on business impact studies conducted after the GDPR's implementation in the European Union to project similar effects on US businesses. Implementing GDPR-like legislation in the United States would significantly strengthen consumer privacy rights but would also create conflicts with national security practices and private business operations. The analysis suggests that while comprehensive privacy legislation is needed, modifications to the GDPR or the adoption of emerging regulations are likely needed to accommodate America's needs.

Nathan Leavitt, Michael Foley, and Kenneth Call

Subject: Health, Nutrition & Clinical Sciences

Managing CMT Disease Symptoms, What Works and What's Missing: A Case Report

Charcot-Marie-Tooth (CMT) disease is the most common inherited neuromuscular disease, resulting in peripheral nerve damage. There are no disease modifying treatments, but symptoms are typically managed with therapies, orthotics, and pharmacology. Research supporting specific treatment guidelines is lacking. The purpose of this case study is twofold: to give an example of key aspects of effective symptom management for an adult with CMT, and to discuss improvements that could have been made to the treatment. This case study involves two months of treatment biweekly for a 48-year-old male who was diagnosed with CMT at the age of 12. The patient has been receiving ongoing skilled physical therapy maintenance for several years. His main impairments include foot drop, tight hamstrings and quadriceps, weak lower extremity (LE) musculature, poor LE motor control, balance difficulty, early fatigue with ambulation, thenar atrophy, flexor digitorum profundus contracture, and poor fine motor control, all bilateral. Interventions consisted of manual hamstring and quad stretching, gait training, core strengthening, cardio, wrist and forearm strengthening. At week two the patient went from averaging one fall a week to zero falls after replacing rigid ankle-foot orthosis (AFO) with articulated AFO's. At week five after a week away from PT the patient's passive straight leg raise lost 10 degrees of range, and he began scuffing his shoes

more aggressively. Within three treatment sessions he was back to previous function. This case suggests that for patients with CMT properly selected AFOs reduce fall risk, general stretching and strengthening effectively maintains patient function of targeted muscle groups, and regression quickly accompanies discontinued treatment. A well-structured and adhered to home exercises program should be a priority for patients with CMT. More research is needed to support these findings.

Mauri Lish

Subject: Business, Economics & Public Administration

The Evolution of Governing in Cyberspace: Evaluating Threat Occurrence and Policy Effectiveness

Over the past five decades, the expansion of the internet has transformed cyberspace from an unregulated arena of open communication into a contested domain driven by evolving governance, cyber attribution challenges, and national sovereignty concerns. My research paper will examine the evolution of U.S. cyber governance by evaluating the relationship between major cyber threats and the effectiveness of the corresponding policy responses. Beginning with the foundational development of the internet and early visions of a borderless digital world, the analysis follows the emergence of federal cybersecurity legislation and regulatory frameworks, including the Privacy Act of 1974, the Computer Fraud and Abuse Act of 1986, FISMA (2002), and sector-specific protections such as HIPAA and GLBA. Through a comparative review of major cyber incidents, such as the Morris Worm (1988), Stuxnet (2009), WannaCry (2017), and the SolarWinds breach (2020), this study assesses whether policy implementation has effectively deterred or mitigated cyber threats. Drawing on cyber incident reporting data from FISMA, NISTs National Vulnerability Database, and the FBIs IC3 complaint and loss reports, the paper evaluates trends in cybercrime occurrence relative to shifts in presidential administrations and cyber security policy strategies. Findings suggest that cyber incidents have consistently outpaced regulatory policy and implementation due to inconsistent enforcement, limited transnational coordination, insufficient deterrent consequences, and the accelerating sophistication of emerging technologies such as artificial intelligence. The study concludes that while U.S. cyber policy has matured in scope and structure over the past 50 years, significant gaps still remain in attribution capability, interagency and international coordination, public and private collaboration, as well as metrics to aid in the analysis of cybersecurity effectiveness. The paper recommends an innovation-driven, internationally cooperative approach to strengthen attribution mechanisms, enhance deterrence, and ensure the confidentiality, integrity, and availability of digital infrastructure in an increasingly complex global cyber environment.

Christopher Louie

Subject: Health, Nutrition & Clinical Sciences

Therapeutic Effects of Various Wavelengths of Light Therapy

Light therapy, or photobiomodulation, is a non-invasive treatment that uses specific wavelengths of light to support tissue healing and athletic recovery. Red (600–700 nm) and near-infrared (800–850 nm) light penetrate deeper tissues and enhance mitochondrial activity, increasing ATP production and stimulating collagen synthesis, fibroblast activity, and angiogenesis. Blue light (400–500 nm) acts more superficially, providing antimicrobial effects while helping regulate inflammation and epithelial repair. This paper reviews the mechanisms behind these wavelength-specific effects and examines their relevance in athletic and wound-healing settings. A 14-day blinded observational trial was conducted to evaluate the effects of combined red and blue light therapy on a superficial turf burn. The wound was divided into treated and shielded control sections. The treated area received daily light exposure, while the control was protected from light. Five blinded observers evaluated standardized daily photographs and in-person presentations, resulting in 70 total assessments. Overall, the treated region was rated as more healed in 47% of observations, compared to 7% favoring the control and 46% reporting no difference. The clearest improvement occurred between days 6 and 10, when 92% of ratings favored the treated area, suggesting accelerated mid-phase healing. By the end of the study, both regions appeared similarly healed. Although limited by sample size and subjective evaluation, these findings support existing evidence that red light therapy may enhance early wound healing and serve as a useful adjunct in athletic recovery and superficial injury management.

Kal Lunders, Jill Harris, and Roy Arana

Subject: Health, Nutrition & Clinical Sciences

Use of Rhythmic Auditory Stimulus interventions in a patient presenting with Parkinsonism and Cerebrovascular Accident history. A single case study

The purpose of this study was to examine interventions using Rhythmic Auditory Stimulation (RAS) to improve gait speed, ambulation, and functional performance in patients with Parkinsonism or a prior history of CVA. Disturbances within the basal ganglia cause movement disorders due to a loss of dopaminergic neurons. RAS has been shown to improve motor learning and performance. Patient presentation included general weakness and bilateral hip pain with a previous history of a CVA, and progressing signs and symptoms of Parkinsonism. Primary impairments included decreased lower extremity (LE) strength, postural instability, bradykinesia, fear of falling, retropulsion, and freezing of gait. Considering these impairments, multimodal interventions included gait training, sit-to-stands, reactive balance training, change of direction, and lateral step overs, which were enhanced with the use of RAS to bypass the internal clock and facilitate greater motor performance. The Numeric Pain Rating Scale (NPRS), Lower Extremity Functional Scale (LEFS), 30-second Sit-to-Stand (30-sec STS), and Manual Muscle Testing (MMT) were used as outcome measures. The NPRS went from 6/10 to 2/10. LEFS improved from 11/80 to 23/80. Muscle strength testing improved from ⅘ MMT on hip flexion and abduction to 4+/5 or greater bilaterally. 30-sec STS improved from 1 to 3 and starting a 4th. Patient reported feeling immensely better in ambulation, transferring, ADLs, and walking without the fear of falling. This case shows improvements in both pain and function, especially in overall LE strength and ambulation. Use of multimodal interventions focused on improvements in neuromuscular facilitation and therapeutic activities, while using RAS to improve Parkinsonian symptoms affecting performance and ability. In conclusion, this study shows that using a combination of RAS with a multimodal approach can facilitate better performance across all functional outcomes.

Matthew Mansfield, Zachary Pugmire, and Michael Foley

Subject: Health, Nutrition & Clinical Sciences

Physical Therapy Management of Post Laminectomy Complications in the Acute Hospital Setting

Sixty-nine year-old male with history of significant lumbar stenosis and sciatic pain due to history of heavy lifting and trauma from industrial work. Following surgical interventions, PT examination revealed the following new impairments; significant ataxia of the R LE with loss of proprioception of bilateral LEs and inability to ambulate due to instability and reduced coordination. Medical diagnosis resulting in impairments is unknown. Patient received physical therapy twice daily from post-op day 0-6. To address loss of proprioception and ataxia, pregait interventions were performed. To facilitate a safe transfer to a rehab facility, transfer training was provided to improve coordination and stability for transfers. Pregait training focused on standing weight shifts, static standing balance, and marching in place with a FWW and simple LE exercises in supine. Transfer training consisted of log roll from supine to sitting, sit-to-stands, and pivot-shift transfers to a wheelchair. Initially, the patient required two person max assist to transfer from supine to sitting due to poor coordination of the LEs and poor stability. He also required two person mod assist to transfer from sitting to standing and while standing due to instability. By POD #6, they were able to transfer from supine to sitting with min assist to move his RLE and transfer from sitting to standing with a FWW independently with increased bed height. No significant changes were observed in their ataxia and proprioception. They stated they felt therapy was helpful. This patient was unique in that the reasoning for their poor condition was unknown. However, the patient was medically stable and cleared for therapy by their surgeon. Thus, treatment was not able to be based around the diagnosis but instead had to be impairment and goal based. While the full impairment could not be addressed, functional ability was improved.

Ivy Marshall, Rene Rodriguez, and Rajib Mahamud

Subject: Engineering, Physical & Mathematical Sciences

A New Approach to Serial Number Restoration via Step-heating Thermography

Serial number restoration is a technique used in the field of forensic science to identify and recover lost or stolen items. When stolen, the serial numbers on vehicles, firearms, or other valuables are often defaced to make them harder to locate. Traditional serial number recovery methods include the use of strong acids and bases, which can lead to evidence being damaged or unusable if the restoration technique is done incorrectly. However, there may be a viable alternative that allows for repeatability, doesn't potentially destroy samples, and is more user-friendly. This method uses a laser to heat an area of

the sample and an infrared (IR) camera to record the surface temperatures of a material over a length of time. The data can then be analyzed to determine the thermal conductivity of the material using a method known as Thermo-Optical Plane Source (TOPS). During analysis, the images are collected as temperature plots, and are then able to be further analyzed to determine the material's thermal conductivity. So far, this method has only been used to measure the thermal conductivity of unaltered materials such as metal plates, as well as some liquids and gases. In our studies, TOPS was investigated as a method for serial number restoration by observing the thermal conductivity differences between stamped and unstamped areas. Since the areas within the number is compressed, the heat dispersion in these two areas should be different. The construction and utilization of TOPS, in our lab, has shown that there can be significant differences in the derived thermal conductivities in these areas. With further method development and an optimized algorithm, this could potentially be a viable alternative to current restoration techniques.

Marie Martinez and Kristina Blaiser

Subject: Humanities, Behavioral & Social Sciences

Scaling Early Intervention: Strategically Using Asynchronous Telepractice

A child's speech and language development is shaped by everyday interactions and relationships with their caregivers. For caregivers of children with disabilities, early intervention (EI) is publicly available in the United States through Part C of the Individuals with Disabilities Education Act (IDEA) (IDEA, 2004). Despite the availability of EI services, many families encounter barriers to participation. These barriers may include living in rural geographic areas, a shortage of qualified providers, work and family demands, or resources and/or economic constraints (Akemoglu et al., 2022). In addition, parents of children with a hearing difference have reported feeling overwhelmed, and their lived experiences and perspectives remain underrepresented in literature, protocols, and training provided to professionals serving these populations (Blaiser & Mahshie, 2022). Asynchronous technologies (AT) have emerged as a potential supplement or alternative to traditional EI delivery models by reducing barriers related to time, location, and provider availability. Learning asynchronously has the potential to teach caregivers the evidence-based practices at a time and place that is convenient for them. The purpose of this project was to review the literature and create an initial program design fidelity checklist to guide the creation of an early intervention asynchronous program for families of children who are Deaf or hard-of-hearing. This work was guided by two research questions: "How can we use asynchronous technologies to support families of young children with a hearing difference across the state of Idaho? And "How are asynchronous technologies designed to support families of children with a hearing difference?" This presentation describes a literature review related to using asynchronous technologies in early intervention and using these data to design family support resources. Effectively designing asynchronous family support programs that have the potential to decrease barriers to early intervention treatments by caregivers gaining access to evidence-based strategies. These asynchronous online training paired with coaching to ensure caregivers reach treatment fidelity (Akemoglu et al. 2022). Also, by incorporating cognitive learning concepts, such as modeling through video resources and behaviorism, self-monitoring, and potentially identifying possible caregiver reinforcers to encourage completion of the asynchronous modules.

William Mayo, Samantha Lindsay, and Trent Jackman

Subject: Health, Nutrition & Clinical Sciences

Acute Ischemic Cerebrovascular Accident Involving the Left Middle Cerebral Artery in a Young Adult Female with Marfan Syndrome: Deficits and Management

Marfan syndrome is a genetic disorder affecting connective tissue in the heart and blood vessels. Aortic root dilation represents a common adverse effect, increasing the risk for cardiovascular and neurological complications imposing demands on physical therapy management considering limitations to physical activity. This case reinforces the clinical decision-making process of maintaining balance of neurorehabilitation goals with strict cardiovascular safety in a young adult with Marfan syndrome following acute stroke. A 22 y/o female presented with chest pain and left hemispheric ischemia symptoms resulting from aortic dissection and subsequent surgical repair before transferring to the ICU. Clinical examination revealed mild expressive aphasia, subtle hypotonia, decreased R UE coordination, and R UE and LE strength deficits of 3/5 and 4-/5, respectively. Further examination found mild R UE proprioceptive deficits, decreased R UE arm swing, slight R LE circumduction, Berg Balance score (BBS) of 40/56, and 10-meter walk test time of 0.68 m/s. Interventions included functional mobility and task-specific gait training, balance and strength exercise, and neuromuscular re-education. Long-term discharge goals included patient ability to perform independent functional mobility with stable vitals, achieve Berg

Balance score of ≥52/56, demonstrate independent self-monitoring of exertion and symptoms, and exhibit independent home exercise program adherence. The patient tolerated all interventions with no cardiovascular complications and clinically meaningful improvements in gait speed and BBS. Fall risk decreased as indicated by BBS of 53/56. She achieved independent functional mobility, demonstrated proper awareness of cardiac precautions using vitals and RPE to guide activity cessation, and displayed proper form with home exercise program. Mild R UE coordination deficits remained at time of discharge with home health recommendations. This case emphasizes the significance of managing neurological deficits and hemodynamic stability in patients with Marfan syndrome following ischemic stroke with early mobilization and rehabilitation of neurological deficits as the recommended treatment approach.

Zion McCain, Trent Jackman, Ankur Padhye, Adam Squires, and Tyler Skanchy

Subject: Health, Nutrition & Clinical Sciences

The psychosomatic effects on ACLR physical therapy in a female high school soccer player: A case report

Among high school athletes, anterior cruciate ligament (ACL) injuries are growing exponentially. Physical therapy (PT) is used in ACL rehabilitation to restore stability, ROM, and function. Many factors influence the rehabilitation process, one of which is psychosomatic effects. The purpose of this case study is to describe the effects of symptoms associated with depression on the recovery process of an ACL reconstruction (ACLR). A 16-year-old high school soccer player presented to outpatient PT with a R ACL tear. The patient presented with decreased ROM and clinical examination revealed a positive Lachman's, Anterior Drawer test, and Thessaly test. Interventions pre and post surgery included PROM, strengthening exercises, neuromuscular reeducation, and balance exercises. One-month post-surgery, her family voiced concerns about depressed behaviors, shown by lack of motivation to participate in PT which reflected in her still demonstrating a loss of ROM and strength indicating delayed recovery. One goal was to be able to demonstrate AROM within 5 degrees of the unaffected side. Future considerations may consider an official outcome measure and patient education addressing psychosomatic factors determining if an outside referral is needed. This case highlights the importance of recognizing symptoms related to depression and its lasting impact these have on the patient and their recovery.

Larisa McOmber, Ujjwal Adhikari, Sebastian Madrigal Nunez, Julianne Nielsen, Dillon Stevens, Virginia Wallace, Devaleena Pradhan, and Kinta Serve

Subject: Biological & Natural Sciences

Short Libby Amphibole fibers induce pulmonary inflammation in mice up to 21 days post-exposure

Short asbestos fibers (SAF) comprise the majority of commercial and environmental exposures but are assumed to have negligible health impacts due to their rapid clearance from the lungs. However, due to their small size, SAF can penetrate deeply into the lungs and cross into the pleural space, where they can remain for years. Since the pleural cavity is a key site of asbestos related disease development, we assessed the effects of SAF on early immune responses in mouse lungs, comparing responses in the interstitial and pleural spaces. Wild-type C57/Bl6 or Ccr2-null mice (deficient in monocyte recruitment) were exposed to a single small dose of SAF or vehicle control administered via oropharyngeal aspiration. Immune responses in wild-type mice were assessed at 7-, 14-, and 21-days post-exposure. Bronchioalveolar lavage fluid (BALF) and pleural wash (PW) were collected and immune cells were identified using flow cytometry. Pro-inflammatory and pro-resolving lipid mediators and TGF-beta were quantified in washes and lung tissue, and histological analyses of lung tissues were performed to measure collagen and assess structural changes. Compared to vehicle, LA exposure resulted in significantly reduced macrophage and neutrophil numbers but increased B and T cells in both the PW and BALF at early time points. Monocytes were increased in the PW on day 7, suggesting recruitment of these cells. Elevated concentrations of pro-inflammatory mediators and pro-resolution cytokines were observed. Additionally, histological alterations consistent with fibrosis were noted in both the saline and LA treated Ccr2-null mice. These data suggest that even a single exposure to a small dose of short amphibole fibers induces protracted inflammatory response. Overall, these findings suggest that the unique cellular composition and immune responses within different pulmonary cavities may drive different responses to asbestos.

Rachel Meyer, Kali Earl, Maria Wong, and Addiction Research Team

Subject: Humanities, Behavioral & Social Sciences

The Relationships Between Hazardous Alcohol and Cannabis Use and Suicidal Thoughts and Suicide Attempts

Suicide is the second leading cause of death for college students in the U.S. (CDC, 2025). Cannabis use has increased in college students with increased legalization (Kerr et al., 2023). The relationship between alcohol use and increased risk for suicide has been established (Lamis et al., 2023). The relationships between hazardous alcohol and cannabis use and suicidal thoughts and behaviors (STB) are less understood. Data was drawn from ART, a study that examined risk/protective factors of substance use. Data was collected between 12/2024 and 03/2025. Participants were 1778 college students from 11 universities in the U.S. (Mean Age=21.12, SD=5.64, 73% female, 74% white). Alcohol use was measured by the Alcohol Use Disorders Identification Test (AUDIT) (Saunders et al, 1993). Cannabis use was measured by the Cannabis Use Disorders Identification Test-Revised (CUDIT-R) (Adamson et al., 2010). AUDIT and CUDIT-R scores of 8+ were considered hazardous. Lifetime and past-month suicidal thoughts and attempts (0=no, 1=yes) were measured by the Columbia-Suicide Severity Rating Scale (Posner et al., 2011). Logistic regression was used to examine the significance of hazardous cannabis and alcohol use on STB. Hazardous cannabis use significantly predicted lifetime (LT) suicidal thoughts (OR=1.67, p<.001) and suicide attempts (OR=1.51, p<.001). When controlling for hazardous cannabis use, hazardous alcohol use was not a significant predictor for LT suicidal thoughts or suicide attempts. Hazardous alcohol use (OR=1.87, p<.05) and cannabis use (OR=2.49, p<.01) were significant in predicting past month (PM) suicidal thoughts. Hazardous cannabis and alcohol use were not significant in predicting PM suicide attempts.Hazardous alcohol and cannabis use significantly predicted STB, and hazardous cannabis use had a more robust relationship with STB. We will discuss the implications of these findings on suicide intervention programs.

Rachel Meyer, Matthew Gish, Hannah Bostwick, Drew Fellenz, Jennifer Gifford, Victor Nettey, Laura Priorello, Shirshendu Sinha, Adriana Vazquez, Byron Smith, Carrie Schinstock, and David Fipps

Subject: Humanities, Behavioral & Social Sciences

Clinical Utility and Impact of Phosphatidylethanol (PEth) Testing in Patients Pursuing Kidney Transplantation

Phosphatidylethanol (PEth) is a whole-blood biomarker that detects alcohol use within the prior 28 days with excellent sensitivity and specificity (Arnts et al, 2021). PEth has been increasingly utilized in the solid-organ transplantation process and the clinical utility has been established in liver transplant candidates (Fipps et al., 2024). The utility of PEth in kidney transplant has been less well-defined. The study was conducted through retrospective chart review of all patients evaluated for kidney transplantation who completed PEth testing between 06/01/2020 and 06/30/2024 across three tertiary referral centers. Data included demographics, dialysis status, transplant status, etiology of renal disease, and psychosocial assessment scores. In patients with a positive PEth, patient-reported alcohol use, concurrent uETG results, and influence of PEth on clinical decision making was reviewed. 2,472 patients (mean age = 56.8 years; 62.6% male; 66.3 % white) were evaluated across the three campuses. 228 patients (9.4%) had at least one positive PEth test, with most test results indicating moderate alcohol use (20-199 ng/mL). For patients with positive PEth tests, 73.9% were diagnosed with an alcohol use disorder, and 95.6% were evaluated by an addiction specialist. When ordered simultaneously, PEth and uETG were discordant in 80% of cases. In 46.5% of positive cases, the PEth test identified a discrepancy from the patient's self-reported use. Positive PEth tests influenced clinical decision making in 70.2% of cases, with listing status and alcohol treatment recommendations being the most commonly affected. PEth testing improved detection of alcohol use in kidney transplant candidates, identifying cases missed by uETG and patient self-report, and disclosing discrepancies that influenced clinical decision making. The high frequency of alcohol use disorder among patients with positive PEth suggests under recognition of risky alcohol use in this population. Routine PEth testing could enhance alcohol detection, guide targeted interventions, and enhance kidney transplant outcomes.

Kaden Mills

Subject: Engineering, Physical & Mathematical Sciences

Bridging the Operational Technology Forensic Gap through Automated Artifact Generation in the THROTL Framework

Protecting critical infrastructure from asymmetric cyber threats requires proactive threat hunting. Defending Operational Technology presents unique challenges. Analysts currently face a forensic gap, as they struggle to differentiate between malicious and benign behaviors because they lack a scalable ground truth baseline linking digital network artifacts to verified physical consequences. Current manual forensic validation methods are inconsistent and fail to generate the high-fidelity datasets required for rigorous modern security assessments. To address this issue, the Threat Hunting Response Operational Technology Lab was established as a collaborative Laboratory Directed Research and Development initiative between Idaho State University and Idaho National Laboratory. The methodology uses a hardware-in-the-loop testbed featuring AutomationDirect programmable logic controllers, physical relays, and thermal transmitters. Unlike purely virtual simulations, this framework synchronizes four distinct data streams, including network packet traffic, physical telemetry, live video verification, and automated human interactions. Optical automation tools and Python scripts are deployed to force consistent hardware reactions, while strict network time protocol server coordination ensures millisecond precision across all data captures. Initial testing demonstrates the successful generation of a self-documenting forensic library. By automating graphical user interface and command-line interactions with legacy equipment, the framework produces entirely repeatable test scenarios. Every digital log is precisely time-synchronized with a video recording of the physical equipment state, definitively correlating digital commands with physical consequences. The testbed also successfully isolates silent physical actions that produce no digital artifacts, highlighting critical defense blind spots.

Spencer Moore, Rachel Sutherland, and Kirsten Mink

Subject: Humanities, Behavioral & Social Sciences

Proxies in Practice: Evaluating 3D-Printed Cranial Replicas for Use in Osteometric Analysis

Three-dimensional scanning and printing technologies are increasingly incorporated into anthropological research and instruction. Digital models are widely used for visualization and archival purposes in institutions of higher education and museums. Far less attention has been given to whether 3D-printed replicas of these digital models can serve as reliable substitutes for skeletal remains in osteometric and other forensic analyses. This question becomes especially relevant in contexts where preservation concerns, stewardship policies, or restricted access limit direct handling of original material. This study evaluates the metric fidelity of 3D-printed cranial replicas by comparing standard osteometric measurements collected from original crania and their corresponding printed counterparts. Three intact human crania were digitized using high-resolution 3D scanning and reproduced at true scale through fused deposition modeling. Established linear cranial measurements were collected from both the original skeletal material and the printed replicas using traditional sliding and spreading calipers. Multiple observers contributed measurements to assess inter-observer variability and to situate proxy-derived measurements within typical ranges of osteometric error. By directly comparing printed replicas to their original specimens, this study assesses whether 3D-printed crania can serve as defensible substitutes for osteometric analysis in research and teaching contexts. In addition to evaluating overall metric agreement, this project examines where printed replicas perform well and how variability may emerge across different measurement types. Establishing both the strengths and limitations of printed proxies expands methodological options while supporting the preservation of original collections and broadening instructional access.

Taylor Moore, Trent Jackman, and Brad Ivie

Subject: Health, Nutrition & Clinical Sciences

Chronic Osteomyelitis and Early Care

Chronic osteomyelitis is a progressive inflammatory bone infection characterized by bone destruction, sequestrum formation, and high relapse rates despite medical and surgical management. Because remission is more common than definitive cure, early interdisciplinary intervention is essential to minimize secondary complications associated with prolonged immobilization. This case report describes a 25-year-old female with a history of chronic osteomyelitis who underwent right above-knee amputation due to disease progression. Physical therapy evaluation was initiated on postoperative day one to assess strength, balance, mobility, and discharge readiness. The patient demonstrated strong

bilateral strength, independent standing balance with a front-wheeled walker (FWW), and high motivation to return home. By postoperative day two, she progressed from ambulating 50 feet with standby assistance to 100 feet and negotiating four stairs with FWW and standby assistance. She achieved independent bed mobility and demonstrated improved single-leg tolerance without increased pain or adverse signs. This case supports the feasibility and safety of early, criteria-based physical therapy intervention following surgical management of chronic osteomyelitis. Early protected mobilization aligned with medical precautions and interdisciplinary coordination may reduce risks of deconditioning, joint stiffness, muscle atrophy, and functional decline. Although limited by its single-case design and lack of long-term follow-up, the findings align with current infection management guidelines supporting combined antimicrobial, surgical, and functional rehabilitation approaches. Early, carefully monitored physical therapy does not treat infection directly but plays a critical role in preserving neuromuscular integrity and optimizing functional recovery during medical management of osteomyelitis.

Mick Morgan and Cory Bennett

Subject: Education, Learning & Training

Shaping Mathematical Identity: How Reasoning-Based Discourse Empowers Student Mathematicians

Developing students' mathematical identity is central to their success in doing mathematics (Aguirre et al., 2013). Part of one's mathematical identity is how they see themselves and how others view them in relation to doing mathematics. The purpose of the larger project was to better understand how a reasoning-centric discourse protocol helps students develop mathematical behaviors for constructing and critiquing mathematical arguments. The primary focus was to understand students' initial mathematical identities, their interpretations, and descriptions of a mathematician, as evident in their drawings of mathematicians. An exploratory qualitative case study design (Bogdan & Biklen, 2007) was used as it allowed the university researcher and teacher-researcher to explore students' discourse-identity relationship in an authentic and natural context and develop initial understandings of how such interactions influence students' perceptions of themselves and what it means to be a mathematician and do mathematics. Initial drawings from 18 students revealed that 14 depicted mathematicians as men, three as women, and one as a family due to unfamiliarity with the term "mathematician." Notably, none portrayed a child as a mathematician. In contrast, the second drawing more accurately reflected the students' own gender and age, with only one girl drawing a male figure. Additionally, students began identifying themselves as mathematicians, with one explicitly writing, "I drew myself because I feel more confident in math than last time." This suggests that students are beginning to see themselves, people their own age and gender, as mathematicians. Findings suggest that reasoning-based discourse can positively influence students' self-perception as mathematicians. The collaboration between the teacher-researcher and a university researcher played a crucial role in fostering this shift, highlighting the impact of intentional discourse and inquiry in shaping students' mathematical identities.

Abigael Mukaz Ntwal and Erika Fulton

Subject: Humanities, Behavioral & Social Sciences

The Relationship Between Trait Anxiety and Metacomprehension Accuracy

Trait anxiety, a personality disposition toward anxiety, is associated with various cognitions and academic performance, ostensibly because worry taxes working memory. However, the association between trait anxiety and metacomprehension (the accuracy of judging one's understanding and learning of text material) remains unclear. Student participants (N = 298) from ISU's SONA system will complete the STAI, a self-report measure of anxiety, a computerized O-span task to assess WMC, and an antisaccade task to measure attentional control. They will also predict their overall performance on a reading task and attempt to distinguish between well- and poorly learned aspects of the read passages. All tasks will be administered in a counterbalanced order. We expect that highly trait-anxious individuals will be similar to low trait-anxious individuals in their reading comprehension and in their ability to discriminate between what they have learned well and what they have not, but will demonstrate lower prediction magnitude, less overconfidence, and longer reading times. However, we predict a moderating effect of WMC such that higher working memory capacity will buffer the negative association between trait anxiety and metacomprehension overconfidence and reading time. If our hypotheses are borne out, it would suggest that the metacognitive accuracy of trait-anxious individuals depends on the match between their cognitive resources and task demands, as well as available and/or employed compensation strategies. Thus, education and clinical professionals may need to consider multiple targets for intervention.

Keegan Mulhill, Eric Tamura, and Bryan Arroyo

Subject: Health, Nutrition & Clinical Sciences

Conservative management for suspected labral injury in a middle-aged male: A single case study

Shoulder injuries are complex with multiple structures presenting in similar fashions. The National Electronic Injury Surveillance System reported 6,689,422 shoulder injuries in the US between 2006-2016. Evidence supports exercise-based interventions aimed at reducing nociception, restoring mobility, strengthening the rotator cuff and scapular musculature, and improving neuromuscular control. This case study describes conservative management of shoulder pain consistent with labral pathology. A middle-aged male presented with right shoulder pain following a basketball injury. He demonstrated limited shoulder range of motion (ROM), pain with movement, strength deficits during lifting, and presented with a positive cluster of tests consistent with labral injury. He denied prior shoulder injury, treatment, or co-morbidities and preferred conservative management to avoid surgery. Physical therapy was delivered twice weekly for six weeks using a multimodal, evidence-based approach. Interventions included instrument-assisted soft tissue mobilization, mobility restoration, scapular re-education, rotator cuff and progressive strengthening exercises, and a structured home exercise program. Treatment progression was guided by symptom irritability and functional tolerance. Outcomes included the QuickDASH, Numeric Pain Rating Scale (NPRS), shoulder range of motion (ROM), and manual muscle testing (MMT). Pain improved from 6/10 to 0/10. Internal rotation increased from 40° to 72°, and flexion and abduction progressed from painful beyond 90° to pain-free throughout range. Strength improved from 3+/5 to 5/5 in flexion, abduction, and external rotation. QuickDASH improved from 20.5 to 0, exceeding the minimal clinically important difference of 15.9, demonstrating meaningful functional recovery. A multimodal conservative rehabilitation program resulted in substantial reductions in pain and restoration of strength and function. Limitations include single-subject design, lack of long-term follow-up, and multiple treating therapists. These findings support conservative management incorporating mobility restoration, progressive strengthening, and scapular re-education as an effective approach for shoulder pain consistent with labral pathology.

Kaylin Muller and Shannon Lynch

Subject: Humanities, Behavioral & Social Sciences

Sexual health knowledge, sexual self-efficacy, and sexual health risk behaviors in women with and without experiences of sexual violence

Sexual violence against women, defined as any sexual behavior that occurs without consent, occurs at high rates and is associated with negative outcomes including increased sexual health risk behaviors (Basile et al., 2020, 2022). Following sexual violence, concerns about contracting HIV/AIDS and other sexually transmitted diseases (STDs) often increase. However, many women do not perceive themselves to be at risk, and knowledge about HIV/STDs is limited (Hickey & Cleland, 2013). Limited knowledge may contribute to greater engagement in sexual risk behaviors, such as condomless sex or having multiple partners. Sexual health education is a strong protective factor and is associated with fewer risk behaviors (Costa et al., 2018). Additionally, positive sexual self-efficacy (i.e. the belief in one's ability to effectively manage sexual situations) has been linked to healthier sexual adjustment, whereas negative sexual self-efficacy predicts greater sexual health risk behavior (Cohen & Fromme, 2002). The current study examined the relations among sexual violence history, sexual health knowledge, sexual self-efficacy, and engagement in sexual risk behaviors. This online study included 282 female-identifying participants recruited using Amazon's MTurk. Participants completed a demographic questionnaire and self-report measures assessing sexual behavior, STD/HIV knowledge, and sexual self-efficacy. Univariate analyses identified that individuals with a history of sexual violence reported an average of 8.97 sexual health risk behaviors (SD = 5.38) while those without reported an average of 5.23 (SD = 3.21). There was no significant difference between individuals with and without sexual violence exposures for sexual self-efficacy or HIV knowledge. These findings replicate previous findings of higher risk behaviors in survivors of sexual violence. However, the results also suggest that sexual violence survivors in this sample were not experiencing greater difficulty negotiating with partners or setting boundaries. Finally, HIV and STD knowledge was low across the sample, suggesting all participants lacked important sexual health information.

Md Masud Un Nabi and Edward Kammerer

Subject: Humanities, Behavioral & Social Sciences

Media Exposure and Public Confidence in the U.S. Supreme Court

Public confidence in the United States Supreme Court is shaped largely through media coverage rather than direct exposure to judicial decisions. As the media environment shifts from traditional news toward online and social media platforms, it remains unclear how different types of media exposure relate to institutional trust. This study examines whether exposure to online news, television news, newspapers, and specific social media platforms is associated with confidence in the U.S. Supreme Court across recent election cycles. This study uses quantitative secondary data analysis of the American National Election Studies (ANES) 2016–2020–2024 panel merged dataset (N = 7,842). Confidence in the Supreme Court serves as the dependent variable. Independent variables include exposure to online, television, and newspaper news, along with platform-specific social media use. Models control for political interest, ideology, party identification, political knowledge, trust in news media, and demographic characteristics. Analyses include descriptive statistics, correlations, chi-square tests, and OLS regression with robust standard errors. The findings show that online news exposure is negatively associated with confidence in the Supreme Court, while television and newspaper exposure show positive associations. Trust in news media is the strongest predictor of confidence. Age moderates the relationship, with stronger negative associations among younger adults. Platform analysis shows lower confidence among Twitter/X, Reddit, and TikTok users, while other platforms are not significant. Confidence declines in 2020 and 2024 compared to 2016. In conclusion, different media environments correspond with different levels of institutional trust. Traditional news exposure aligns with higher confidence, while some digital environments are associated with lower confidence, highlighting the role of media systems in shaping perceptions of judicial legitimacy.

Costain Nachuma and Minhaz Zibran

Subject: Engineering, Physical & Mathematical Sciences

Teaming Up with Autonomous AI Agents for Software Development: Where Are We Heading?

As autonomous coding agents become common contributors to software development, understanding how they integrate into human-driven workflows is critical for the future of the field. This study presents an empirical analysis of over 33,000 agent-authored pull requests (PRs) to identify the collaboration signals associated with successful integration. While 71.5% of agentic PRs are ultimately merged, success rates and resolution times vary substantially across different AI agents. Quantitative modeling shows that reviewer engagement is the strongest predictor of a successful merge. In contrast, large code changes and disruptive coordination behaviors such as force pushes during active review significantly reduce the likelihood of integration. Complementary qualitative analysis reveals that successful agentic contributions depend on participating in stable, actionable review loops that progressively align with human expectations, rather than simply increasing the volume or speed of code changes. These findings highlight that effective agentic software engineering requires more than technical correctness. To succeed, AI agents must also align with the social and procedural norms that govern human collaboration in software development.

Madison Nations, Brooklyn Bair, Siena Levine, Brenn Brown, Cooper Christensen, Nolin Fong, Saul Labra, Reagan Pack, AnnaMaria Salas, Adolfo Salgado, Emily Salgado and Noah Thompson

Subject: Biological & Natural Sciences

A journey into the unknown: Discovery and Genome Annotation of Novel Bacteriophage Shroomer

Shroomer is a novel Microbacterium foliorum NRRL B-24224 bacteriophage isolated from a soil sample collected by a patch of unidentified mushrooms in Pocatello, ID, USA. This phage was purified then imaged via transmission electron microscopy, revealing siphoviridae morphology. Shroomer was sequenced by the University of Pittsburgh Bacteriophage Institute. Based on genetic content similarity, Shroomer was classified as an ED2 subcluster phage. Shroomer's genome was annotated using the PECAAN (Phage Evidence Collection and Annotation Network) platform and protein coding genes were identified using Glimmer and GeneMark. Gene start sites were refined through Starterator and ribosomal binding site (RBS) analysis. Gene functions were assigned from protein-level comparisons utilizing HHPRED and NCBI BLAST. Our results show that Shroomer has unique "tool" genes that may help it successfully infect and manipulate its host. These genes include a DNA helicase, DNA polymerase, RNA ligase, Acb2, glycosidase hydrolase, and oxidoreductase. Phages utilize host DNA helicases and DNA

polymerases to replicate their genomes during infection; Shroomer possesses its own DNA helicase and DNA polymerase which improves efficiency of DNA replication. Shroomer's RNA ligase helps repair damaged tRNA. Additionally, Shroomer's glycosidase hydrolase, allows it to break down bacterial cell walls. Of particular interest to us, is Shroomer's oxidoreductase gene, which may help keep the host cell functioning during infection. Together, these nonessential "tool" genes improve Shroomer's fitness.

Ifeyinwa Ndukuba

Subject: Humanities, Behavioral & Social Sciences

Gendered Gaze and the Blame of the In(visible) Female Body in Ancrene Wisse

This paper examines how the medieval text, Ancrene Wisse, portrays the oppressive dynamics of hegemonic ecclesiastical surveillance and the internalized male gaze on anchoresses, leading to the attribution of blame to the religious female body. It argues that this gendered gaze negatively impacts female subjectivity and agency. The text reveals how women are positioned to perceive their own bodies as objects of a fear-inducing male gaze and internalized surveillance that stifles agency, leading to an unconscious consent to self-blame for male transgression. This dynamic creates a double oppression stemming from both external patriarchal scrutiny and self-surveillance. Specifically, this study focuses on the anchoress's complex relation with the medieval church's patriarchal surveillance, which was ironically initiated by their request for a rulebook. It moves beyond simply examining how patriarchal structures of the medieval church supervised the anchoresses' bodies to investigate how anchoresses actively resist oppression and assert agency within these constraints. The central argument is that anchoresses, despite being subjected to profound external and internalized control, develop forms of resistance against these oppressive gazes to assert their agency within the same system of oppression. To analyze these gendered relations of the gaze and the self-monitoring relationship with the female body, this study employs theoretical concepts from the British feminist film theorist, Laura Mulvey's the "Male Gaze" and Sigmund Freud's psychoanalysis, particularly the concepts of the unconscious and repression. The term "gendered gaze" refers to both the "male gaze," and the "female gaze" with the latter being a critical response to Mulvey's theory. This study examines the concept of an internalized gaze, a form of self-surveillance that stems from the oppressive dynamics of the external gaze.

Jocelyn Nichols

Subject: Humanities, Behavioral & Social Sciences

Navigating Community Research

Research conducted within university settings often relies on convenience samples that may not adequately represent the population of interest and decrease study reproducibility. While campus-based research offers important advantages, community-based research is essential when examining real-world concerns that may not exist in a university sample. While developing my dissertation, which focuses on reducing burnout among elementary education teachers through a mindfulness-based intervention, I aimed to recruit directly from the community. The proposed project was designed to go into an elementary school and implement a mindfulness-based intervention aimed at reducing workplace burnout during a professional development day. However, the development and implementation of this project required navigating multiple levels of approval, including a dissertation committee, Institutional Review Board, school district, and individual school leadership. Following an initial rejection, the study design was revised to address organizational constraints, align with district policy, and to better meet the needs of the community sample. Data collection for this project is still ongoing, yet the approval process highlighted important structural factors and the importance of building relationships to establish trust when wanting to conduct community-based research. This also represented the challenges of aligning academic research goals with outside institutional policies. My project has represented the importance of flexibility, collaboration, and trust-building when trying to engage the community in research. Adapting my study required learning to balance the importance of methodological rigor with the feasibility of conducting research in outside organizations to benefit all involved.

Anyauba Nmaju, Sarah Hobdey, and Emily Price

Subject: Biological & Natural Sciences

Characterizing a new therapeutic strategy for the treatment of necrotizing soft tissue infections caused by group A streptococcus

The devastating manifestation of Group A Streptococcus (GAS) necrotizing soft tissue infections (NSTIs) is driven by toxin production and exacerbated by the reliance on surgical removal of infected tissue as the only lifesaving treatment. To provide a new treatment option for GAS-NSTIs, we developed human monoclonal antibodies (huMAbs) targeting streptolysin O (SLO), a key pore-forming toxin that drives NSTI progression. Our lead candidates (C11, G4, and L17) show potent in vitro SLO neutralization; however, only L17 offered protection in a murine model of GAS-NSTI. We hypothesize that the driving force for the variance in in vivo efficacy is due to differing mechanisms of SLO inhibition. Using random mutagenesis, site-directed mutagenesis, and Fab fragment generation, we mapped and characterized each huMAb's epitope-specific contribution to SLO neutralization. Our results show that C11 and G4 targeted overlapping linear epitopes near the membrane binding site, while L17 bound to a conformational epitope required for oligomerization. Additionally, L17 Fab fragments retained neutralizing activity, whereas C11 and G4 Fab fragments lost neutralizing activity, suggesting that C11 and G4 rely on the Fc-mediated steric hindrance to block SLO membrane binding. These findings indicate that L17 modulates a unique mechanism of action that is less reliant on full-length antibody, potentially explaining its superior in vivo efficacy. To further test this hypothesis, future work will focus on characterizing the biophysical and pharmacokinetic properties of the huMAbs. Together, these studies identify protective SLO epitopes and huMAb features that will inform the selection and advancement of optimized candidates for clinical development against this devastating disease.

Sydney Nogosek, Bryan Arroyo, and Eric O'Quinn

Subject: Health, Nutrition & Clinical Sciences

Rehabilitation of Cervical Referred Pain and Fear Avoidance Behaviors Following C7 Fracture: A Case Study

Prolonged cervical collar immobilization can lead to decreased motion, fear of movements, and increased levels of disability. Evidence supports the use of manual therapy, exercise, and education to address neck pain and psychosocial factors (anxiety). The purpose of this case study is to describe the examination, intervention, and outcomes of a patient with cervical referred pain and fear-avoidance tendencies following a C7 fracture treated with manual therapy, exercise, and education. This is a single pt case study of a 25 y.o. male carpenter with C7 fx following MVA presenting with complaints of neck pain and dependence on a cervical collar. Patient reported posterior neck pain, tightness with pain in the upper trap, with anxiety about reinjury/fear of returning to work and recreational weightlifting. Examination findings revealed limited cervical rotation and extension, limited cervical joint mobility, upper trapezius muscle tightness, decreased deep neck flexor endurance, with no neurological abnormalities. Outcomes revealed increased cervical extension from 28° with pain to 30° without pain, R cervical rotation from 35° with pain to 60° without pain, DNF endurance from 12 seconds to 40 seconds, and an DNI score from 14 (28%) to 7 (14%) exceeding the MCID of 7 points. In conclusion, the patient showed improvements following the multimodal approach of MT, Ther Ex, and pt education to help reduce pain, disability, and fear avoidance behaviors to improve function of cervical referred pain. Initial treatment focused on cervical mobility and education on tissue healing times and gaining confidence in cervical loading. Later appointments focused on cervical strengthening and discussion of psychological management. Interventions included cervical joint mobilization, soft tissue mobilization to upper trapezius, deep neck flexor training, and a progressive HEP. Throughout the course of treatment, the patient began taking anxiety medication and seeing a therapist to address fear avoidance behaviors.

Sadicamin Oboh

Subject: Humanities, Behavioral & Social Sciences

A Comparative Analysis of Digital Discourse on Bad Bunny half-time show performance

The study analyzes how social media platforms affordances encourage the arrangement and expression of public opinion with respect to socially critical events, using the 2026 NFL Super Bowl halftime show featuring Bad Bunny as an essential case. In this time of hyperactive-mediated-computer communication, large- scale entertainment events serve as catalysts for different social discussion, and political friction and nationalist sentiment on social media. Drawing on Jürgen Habermas' (1962) foundational concept of the Public Sphere, this paper will assess whether these digital platforms serve as a genuine open space

for rational-critical debate, opinion conformation, and communal engagement. Using a mixed-method approach, the paper will utilize the Communalytic software to analyze and dissect a dataset of 400 commentaries from Reddit and YouTube. Through a combination of computational sentiment analysis and manual thematic coding, the paper aims to (1) classify the essential themes around the 2026 halftime show performance, and (2) to note salient patterns and designs of symbolism within the discourse. The paper will frame expected results on previous literature that recommends social media provides a stage for marginalized voices and verbal diversity, it also presents challenges similar as" incivility" and" echo chambers" that may help the indifferent ideals of the public sphere. The findings will offer understanding into how digital platforms empower worldwide views, opinion formation to users as to negotiate complex issues of identity, dissatisfaction, and social solidarity within the digital environment. This study will contribute to the field of digital media, public sphere communication, and networked society by bridging classical democratic theory with contemporary computational social science methods.

Donovan Olson, Juergen Riedelsheimer, William Cook, and Erika Fulton

Subject: Humanities, Behavioral & Social Sciences

Manipulating Self-Efficacy to Probe Metacognitive Monitoring and Control in Musical Pattern Recognition

Self-efficacy reflects how strongly someone believes they can succeed at a specific task. Prior work often relies on longitudinal interventions in which self-efficacy changes alongside learning, making it difficult to isolate the effect of perceived competence apart from learning. Our study tests whether experimentally manipulating perceived competence alters metacognitive monitoring during musical and rhythmic pattern recognition, as measured by trial-by-trial confidence ratings. We randomly assign participants to one of three practice-phase feedback conditions: High Self-Efficacy (HSE: 80% positive/20% negative feedback), Low Self-Efficacy (LSE: 20% positive/80% negative feedback), or a veridical-feedback control group. We built the stimuli in Max/MSP for four categories: four stimulus libraries that vary pitch-system structure (modal, microtonal) and rhythmic structure (8th-note grid, syncopated 16th-note grid), which we selected to vary listening uncertainty without crossing pitch and rhythm features. In each trial, participants hear an original excerpt, complete a short distractor task, and then choose between two clips (original vs foil). Participants may replay the original stimuli once before deciding between the original and the foil and rating their confidence on a scale from 1 to 100. Perceived competence (self-efficacy), assessed via a 6-item Likert questionnaire at baseline (pre-practice) and immediately post-practice (manipulation check), should rank HSE > Control > LSE following the practice feedback induction (H1). H2a: Condition (HSE/Control/LSE) will predict trial-level confidence; we expect the clearest between-condition differences in the high-uncertainty subset (microtonal + syncopated 16th-note grid). H2b (exploratory): Condition will also relate to confidence–accuracy alignment in that subset; we do not predict a direction. H3 The LSE group will use the replay option more frequently and exhibit longer decision latencies than HSE participants in the pre-specified high-uncertainty subset. Overall, the study tests whether induced task-specific self-efficacy shifts metacognitive monitoring and control.

Austin Oswald, Devin Bean, and Tarang Jain

Subject: Health, Nutrition & Clinical Sciences

Improved Strength and Motor Control Decrease Pain Despite Persistent In-Toeing Gait: A Pediatric Case Report

Idiopathic in-toeing is often attributed to structural causes, such as femoral anteversion or tibial torsion. However, many children report pain and functional limitations that seem disproportionate to these findings. Emerging evidence suggests that generalized joint hypermobility and reduced neuromuscular control may play a larger role in symptom presentation than alignment alone. This case is clinically meaningful because the patient presented with bilateral in-toeing along with hypermobility, sensory sensitivity, and activity-limiting pain. The purpose of this case study was to determine whether the in-toeing itself was the primary diagnosis or a secondary presentation related to hypermobility and decreased motor control. The patient was a 9-year-old male seen in an outpatient pediatric physical therapy setting for 10 weeks. He was referred for right greater than left in-toeing without a history of trauma and reported quadriceps night pain and variable musculoskeletal pain. Examination revealed generalized joint hypermobility (Beighton 5/9), below-average BOT-2 scores in body coordination and strength/agility, and persistent bilateral in-toeing during gait. Structural causes, including excessive femoral anteversion and tibial torsion, were ruled out. Initial treatment focused on hip alignment through stretching and strengthening of the external rotators. However, intervention shifted toward impairment-based rehabilitation, emphasizing posterior chain strengthening, core stabilization, flexibility, and gait training. By session 10, the patient’s night pain and variable pains had

resolved, and he reported uninterrupted sleep. Although in-toeing mechanics showed minimal visible change, pain reduction was clinically meaningful and functionally significant. These findings suggest that in-toeing was not the primary pain generator. Instead, improvements were likely due to enhanced neuromuscular control and dynamic stability in the context of hypermobility. This case supports a function-focused rather than appearance-focused rehabilitation approach for pediatric in-toeing.

Tyler Otterlei, Ryan Pope, and Trent Jackman

Subject: Health, Nutrition & Clinical Sciences

CVA Rehabilitation in an Elite Athlete Compared to the General Population: A Clinical Case Study

Cerebrovascular accident (CVA) is one of the leading causes of death and disability in the United States, accounting for approximately 7.3 million deaths and an estimated 12 million cases each year. Current research highlights optimal rehabilitation among the general population. However, a gap exists regarding post-CVA rehabilitation among elite athletes and the need to develop standardized intervention templates. The purpose of this case study is to describe the presentation, management, and outcomes of an elite athlete post-CVA to guide future practice. A female elite athlete, aged 60, presented to outpatient physical therapy following a L CVA suffered 3 days prior. Initial evaluation revealed impairments in strength, balance, gait, and performance of functional tasks. Patient precautions included no running or weight training for 30 days, while patient-specific factors included tendency to exceed precautions, requiring ongoing education and monitoring. Treatment structure included intensive 80-minute treatment sessions five times per week for two weeks, followed by clinic-standard 40-minute sessions three times per week for four weeks. Goals for treatment included promoting functional independence and facilitating return to the patient's high-intensity fitness competition, adhering to the set precautions. The patient demonstrated a clinically significant outcome, tolerating all interventions with no adverse effects. Objective measures were re-evaluated three weeks after initial evaluation with vast improvements in strength, balance, gait, and performance of functional tasks. The patient was fully independent in ADLs and functional tasks. Therefore, treatment shifted to restoring remaining strength and endurance to facilitate safe return to high-intensity fitness competition, progressing as tolerated. Six weeks into treatment, the patient's precautions were lifted, and she returned to fully participating in high-intensity fitness competition before discharge. This case highlights a successful plan of care incorporating an intervention template that addresses the current gap in research between elite athletes and CVA recovery.

Brandon Parra, Bryan Lawson, and Trent Jackman

Subject: Health, Nutrition & Clinical Sciences

Pain Without Pathology: A Case Of Nociplastic Pain After Broström–Gould ATFL Repair

The modified Broström–Gould procedure is widely regarded as the gold standard surgical technique for anterior talofibular ligament (ATFL) repair, demonstrating superior short and mid-term pain reduction, return to sport and function, and patient satisfaction within the first postoperative year. Persistent pain beyond expected tissue healing (6-12 months), particularly in the absence of structural pathology, is uncommon and poorly understood. Nociplastic pain refers to pain arising from altered nociception despite no clear evidence of actual or threatened tissue damage. The purpose of this case report is to describe a presentation consistent with nociplastic pain following an otherwise successful ATFL repair and explores factors and implications influencing physical therapy (PT) management. An active 18-year-old female returned to PT approximately one-year post-operatively following a left Broström–Gould repair with spontaneous, persistent ankle pain. The patient previously participated in PT successfully and was discharged pain-free at 5 months post-op. Re-examination at 1-year revealed tenderness to palpation over the ATFL with normal range of motion, strength, balance and a well-healed incision. Numeric Pain Rating Scale (NPRS) scores were 3/10 at rest and 7/10 at worst. A follow-up MRI found intact repair integrity, no signs of degenerative tissue changes, and mild peroneal tendon inflammation - which did not correlate with the patient's complaints or symptoms. The patient participated in eight weeks of PT including therapeutic exercise, neuro-muscular re-education and manual therapy. NPRS scores showed no improvement over the course of the 8-week plan of care with the patient. As pain resolution was the primary impairment and goal to be addressed, it is of most relevance to this case. No other outcome measures were utilized. Given stable mechanical integrity, absence of functional deficits, limited response to conventional rehabilitation, and emerging psychosocial contributors, the presentation was considered consistent with nociplastic pain. This case highlights the need to consider pain mechanism classification and psychosocial influences when persistent postoperative pain does not align with structural and examination findings.

Aney Rani Paul, and Farjana Eishita

Subject: Engineering, Physical & Mathematical Sciences

Comparing Gaze-Pinch and Touch Interaction for Gaming on Apple Vision Pro

The shift to spatial computing on platforms like the Apple Vision Pro (AVP) requires a meticulous reconsideration of key principles in Human-Computer Interaction (HCI), especially in a high-throughput domain such as gaming. The AVP offers two primary interaction modalities for selection: the decoupled, low-effort Pinch + Eye-Tracking and the coupled, intuitive Direct Touch/Tap. It is currently unclear which modality offers superior user performance for rapid target acquisition. This paper addresses this gap by presenting an empirical comparison of these two techniques in a custom-developed balloon-gallery game. A controlled within-group experimental design was executed with ten participants. Performance, measured by the total score achieved in a 30-second interval, was analyzed using a Paired Samples t-test. The results of the analysis demonstrate that there are no statistically significant differences in performance between the Gaze-Pinch and the Direct Touch/Tap methods for this task. These findings establish the functional equivalence of the two input modalities, providing critical guidance for developers optimizing interaction schemes for efficient spatial gaming and visionOS applications.

Mahnaz Poorshahidi, Ify Ndukuba, and Suhaib Malkawi

Subject: Education, Learning & Training

Generative AI in Writing Assignments

As generative artificial intelligence (AI) rapidly reshapes higher education, writing assignments have become a primary site of pedagogical uncertainty. This field study examines how faculty across four departments, English, Communication, History, and Philosophy, are responding to the growing presence of large language models (LLMs) in student writing. Based on interviews with sixteen instructors, the project investigates three central questions: What are instructors' underlying learning goals for writing assignments? How vulnerable are these assignments to AI-generated responses? And how might assignment design evolve to preserve meaningful learning outcomes? Our findings reveal that AI use is concentrated in lower-level courses, where generic prompts and summary-based tasks are more common, while upper-division courses report significantly lower misuse. However, vulnerability is less a matter of course level than of design. Assignments that emphasize specificity, scaffolded processes, disciplinary thinking, and visible drafting practices demonstrate greater resistance to AI substitution. Rather than advocating prohibition, this study argues for strategic adaptation: integrating AI literacy, redesigning prompts, and foregrounding process over product. Ultimately, the challenge of AI compels a reexamination of what writing assignments are meant to cultivate, and how educators can design for intellectual engagement in an AI-mediated academic landscape.

Braden Powell, Roman Testani, and Ankur Padhye

Subject: Health, Nutrition & Clinical Sciences

Aquatic-to-Land Rehabilitation Improves Function in ACL Rupture with Early Osteoarthritis

Anterior cruciate ligament (ACL) rupture with accompanying knee osteoarthritis (OA) presents a rehabilitation challenge when surgical reconstruction is deferred in anticipation of total knee arthroplasty. Limited literature describes optimal conservative management in this population. The purpose of this study is to examine the effectiveness of a progressive aquatic-to-land rehabilitation program in improving pain and function in an ACL-deficient patient with early OA. The case includes one 44-year-old male delivery worker with a grade III right ACL tear and grade II left ACL tear who elected nonoperative management. This was a single-subject case study conducted in an outpatient orthopedic setting. The patient participated in physical therapy for 16 weeks beginning one-month post-injury. Treatment emphasized quadriceps and hamstring strengthening, neuromuscular control, and functional training. Aquatic therapy was performed 3×/week with graded weight bearing via water depth and repetition adjustments, followed by gradual transition to land-based strengthening. Outcome measures included the Knee Injury and Osteoarthritis Outcome Score (KOOS) and Pain Rating Scale (PRS). Statistics were used to compare changes over time to established minimal detectable change (MDC) values. KOOS' transformed score improved from 43 at initial evaluation to 75 at discharge (+32 points). PRS improved from 6/10 to 2/10. Improvements were most pronounced during the aquatic-dominant phase, with plateauing noted during later land-based progression. A progressive aquatic-to-land rehabilitation program resulted in clinically meaningful improvements in pain and function in an ACL-deficient patient with early OA. In conclusion, conservative management incorporating early aquatic therapy may provide a viable functional bridge for patients delaying surgical intervention. Structured aquatic-based rehabilitation may allow clinicians to offload the joint while restoring strength and stability supporting function in patients with OA and ACL deficiency.

Brianna Prien, Andrew Harmon, and Erin Rasmussen

Subject: Humanities, Behavioral & Social Sciences

Effects of Acute Stress on Food and Monetary Delay Discounting

Stress is associated with obesity and weight gain in college, increasing the likelihood of negative health outcomes, such as heart disease and type-2 diabetes. Stress also releases cortisol and dopamine, leading to increased food consumption. Delay discounting (DD) a behavioral mechanism that underlies obesity, refers to a pattern of preference for smaller, immediate over larger, delayed rewards. One study shows that stress is associated with increased food, but not monetary, DD. The current study added to this work by experimentally determining the extent to which an acute stress condition, compared to a control condition, affected DD for food and money in students with high or low chronic stress. After assessing chronic stress levels, 66 participants (ISU students) completed baseline food and money DD tasks and baseline heart rate measurements. In the acute stress condition, participants delivered a mock interview speech to "sell themselves" for a hypothetical job. Participants in the no-stress control condition read a magazine and completed basic arithmetic. Participants then completed post-food and money DD and heart rate measures. Preliminary data analyses with 66 of the required 73 participants (via power analysis) were performed. The acute stress condition induced higher heart rate in both low and high chronic stress participants. However, to date, there was no main effect of the acute stress condition on food or monetary DD. In addition, there was no main effect of chronic stress on food or money DD or heart rate change nor an acute X chronic stress interaction on these variables. However, because of their preliminary nature, additional data analyses will be conducted when data collection is complete.

Edward Prince

Subject: Health, Nutrition & Clinical Sciences

Functional Outcomes Following Postoperative Rehabilitation After Left Rotator Cuff Repair: A Case Study

Rotator cuff tears frequently result in pain, strength deficits, and functional limitation in older adults. Postoperative rehabilitation is standard after surgical repair; however, measurable functional outcomes in older patients are inconsistently reported at the case level. Purpose: To describe changes in pain, range of motion, strength, and upper extremity function following a 16-week postoperative physical therapy program in a 65-year-old male after left rotator cuff repair. A 65-year-old male underwent left rotator cuff repair in October 2025 after failed conservative management. Magnetic resonance imaging confirmed the tear. At initial physical therapy evaluation, active shoulder flexion was 90°, external rotation was 30°, and rotator cuff strength was 3/5 indicating impairments in both range of motion and strength. Pain was 4/10 on the Numeric Pain Rating Scale (NPRS). The Disabilities of the Arm, Shoulder, and Hand (DASH) score was 52. Rehabilitation progressed from protected passive motion to active motion and resisted strengthening over 16 weeks. At discharge, shoulder flexion improved to 155° and external rotation to 70°. Strength improved to 4+/5. Pain decreased to 1/10. DASH score improved from 52 to 14. The patient resumed independent overhead and household activities. A structured, progressive rehabilitation program resulted in substantial improvements in pain, motion, strength, and function following rotator cuff repair in this patient.

Victoria Pritchett, Jill Harris, and Kevin Nebeker

Subject: Health, Nutrition & Clinical Sciences

When Grief Changes the Body: Emotional Distress and Stroke Rehabilitation in a Skilled Nursing Facility

Emotional regulation is frequently disrupted following anterior cerebral artery stroke due to prefrontal involvement. In skilled nursing facilities (SNFs), patients with chronic neurologic deficits may be especially vulnerable to stress-amplified symptom perception. This case examines how acute grief influences neuropathy and physical therapy engagement in a long-term care resident with chronic stroke. The patient had a history of R middle cerebral artery CVA, type 2 diabetes mellitus, diabetic polyneuropathy, essential hypertension, atherosclerotic heart disease, class III obesity, chronic left hemiparesis, and lymphedema. After the death of a loved one, they demonstrated increased crying, increased symptoms of neuropathy, and decreased activity tolerance. Physical therapy was provided three times per week for six weeks following a referral for functional decline. Interventions included manual lymphatic drainage, desensitization, soft tissue mobilization, neuromuscular re-education, and functional mobility training in a standing transfer aid. Pain neuroscience education (PNE) was used with patient friendly language to explain how stress can increase nervous system sensitivity and amplify pain, despite the body not being in true danger. Progress was monitored through activity tolerance, trunk control, behavioral

response to pain discussion, and symptom reporting. As emotional distress was acknowledged and PNE was incorporated during treatment sessions,, the patient demonstrated reduced tearfulness during sessions, decreased frequency of neuropathy, improved trunk control, and increased standing tolerance. Transfer assistance levels did not significantly change, likely influenced by chronic hemiparesis and obesity. However, participation and symptom reactivity improved. This case reshaped my clinical reasoning by highlighting that emotional regulation is not independent of physical therapy, but central to symptom experience and engagement in therapy. Addressing grief and nervous system sensitivity while also treating physical impairments may improve participation and functional tolerance in SNF stroke rehabilitation, even when global mobility outcomes remain unchanged.

Md Fazle Rabbi, Asif Kamal Turzo, Arifa Islam Champa, and Minhaz Zibran

Subject: Engineering, Physical & Mathematical Sciences

Understanding SBOM Adoption and Quality in Open-Source Software

Modern software relies heavily on open-source components, which increases the risk of software supply-chain attacks when vulnerable dependencies are introduced. Software Bills of Materials (SBOMs) are designed to improve transparency by listing the components and dependencies used in a software system. Although SBOMs are increasingly promoted by governments and security organizations, their real-world adoption and quality in open-source software remain unclear. This project investigates how commonly SBOMs are adopted in open-source projects and whether existing SBOMs are sufficiently complete for security use. We analyzed over 3,000 open-source projects hosted on GitHub, including projects that publish SBOMs and comparable projects that do not. We extracted project-level characteristics such as documentation size, collaboration structure, and development activity. To identify factors associated with SBOM adoption, we applied statistical modeling using repeated sampling to ensure robust results. In addition, we examined nearly 300 SBOM files and evaluated them against widely accepted minimum requirements defined by national cybersecurity guidelines. We found that SBOM adoption is more strongly associated with project organization and documentation quality than with development activity or code complexity. Projects with clearer structure and better documentation are more likely to publish SBOMs. However, most existing SBOMs are incomplete. Only a small fraction include all required information needed for effective security analysis, such as supplier details and dependency relationships. Our findings suggest that simply publishing an SBOM is not enough. Many open-source projects lack the organizational support or tooling needed to produce high-quality SBOMs. Improving documentation practices, tool usability, and awareness can help close the gap between SBOM availability and practical security.

Shojibur Rahman, Reece Foulkrod, Farjana Eishita, and Curtis Whitaker

Subject: Education, Learning & Training

Lit-VR: A Gamified Virtual Reality Platform for Postsecondary Education in Literature

The incorporation of gamified Virtual Reality (VR) tools in English education has the potential to transform student learning and assessment. VR offers an immersive and interactive environment where students can engage directly with characters, settings, and themes taken from classic literary works. This dynamic approach not only enhances a deeper understanding of literary concepts but also ignites a genuine passion for literature. In this project, we are developing a low-fidelity prototype of a gamified VR environment for English literary works in order to enhance the learning experience of students at the postsecondary level. This work-in-progress project currently have a baseline platform of an in house VR game Lit-VR that portrays the 17th century London and the vicinity. The ultimate goal of the project is to analyze the impact of this gamified VR platform on the overall learning outcome of post-secondary learners.

Joshua Richardson, Sierra Baca-Zeff, and Erin Rasmussen

Subject: Humanities, Behavioral & Social Sciences

Effects of Visual Food Cues and Non-Food Cues on Delay Discounting and Salivation

Food Cue Reactivity (FCR) is an individual difference variable in which conditioned food cues induce changes in physiological (e.g., salivation), subjective (e.g., cravings), and behavioral (e.g., eating) responses. Reinforcer pathologies (RP) refer to the overconsumption and valuation of a reinforcer, such as food. One behavioral process in RPs involves high delay discounting, or devaluation of delayed rewards. Few studies have investigated the effects of food cues on delay discounting. The current study did this by testing the extent to which food images vs. non-food images induced greater delay discounting, salivation, and self-reported food cravings. Using a within-subjects design, 64 participants were presented with

two conditions: food cues vs. non-food cues. The food cue condition was comprised of 20 digitally presented standardized images of food; the non-food cue condition contained 20 visual images of objects unrelated to food. During both cue presentation conditions, swallowing was measured via electromyography as a proxy for salivation. Participants also completed a delay discounting measure of food, in which they made choices between smaller sooner vs. larger delayed bite of food and a self-report measure of food cravings. Results suggested that food cues significantly increased salivation compared to non-food cues, but did not affect food cravings or food delay discounting. These results show that the mechanisms that drive food cue reactivity and food reinforcer pathologies may be differentially affected by visual food cues.

Juergen Riedelsheimer, Nell Flanders, Jon Armstrong, and Andrew Silva

Subject: Humanities, Behavioral & Social Sciences

Medial-Frontal Control Signals in Musical Expectancy Conflict (Proposal)

Medial-frontal control systems centered on dACC/MCC coordinate with prefrontal circuits to adjust control after conflict and to proactively tune control when conflict becomes likely, or rules become unstable. Few studies test music expectancy conflict with an independent interference localizer and explicit manipulations of expected conflict and rule volatility. We test whether this control signal generalizes to music-based cadence expectancy conflict under selective listening, using MSIT only to define an independent medial-frontal ROI proxy. Visit 1: Participants complete the MSIT during Kernel time-domain fNIRS to define an MSIT-anchored medial-frontal ROI proxy within a predefined medial-frontal channel set, using the Interference–Control contrast. Visit 2: Participants attend to a cued ear and make a 2AFC judgment about whether each cadence ends as expected or unexpected (accuracy DV). In the primary dichotic mode, we present the target stream to the attended ear while playing an acoustically similar, task-irrelevant distractor in the opposite ear. A monaural-mixture control presents both streams to one ear while keeping expected and unexpected cadences separate, shifting competition from cross-ear selection to within-ear masking. The music task adjusts conflict likelihood by altering the base rate of unexpected blocks (high vs. low) and target-ear volatility by changing the frequency of ear rule switches (stable vs. frequent), keeping unexpected prevalence constant. We treat HbO as the primary fNIRS outcome and estimate effects with kernel-based GLMs that control short-separation and motion/systemic nuisance. Confirmatory tests assess effects within the MSIT-anchored ROI proxy and quantify ROI transfer by comparing inside-ROI and outside-ROI results; we treat outside-ROI tests as exploratory and correct for multiple comparisons. Given fNIRS depth limits, we interpret effects at the channel/contrast level rather than as precise deep-ACC localization. Our pilot study will estimate within-subject effect sizes and data loss to support interaction-term power analyses and to strengthen feasibility, reproducibility, and cross-domain inference.

Dillan Ritmiller, Jason Mckee, and Ankur Padhye

Subject: Health, Nutrition & Clinical Sciences

Multimodal Physical Therapy Management of Mid-Thoracic Pain in a Work From Home Employee: A Case Study

Since COVID-19 there has been an increase in companies moving to the Work From Home (WFH) option. However, the ergonomic and activity standards for this population remain poorly defined, contributing to postural dysfunction and musculoskeletal pain. This case study aims to fill the gap and demonstrate the effectiveness in specific conservative physical therapy interventions in reducing mid-thoracic pain in the WFH population. In this case study, a 55 year old female presented with severe mid-thoracic pain, on-going for three months that heavily affected her WFH, sleeping, sit-to-stand transfers and general expansive arm movements without much relief from pain medication. Examination showed that extension range of motion (ROM) in both the cervical and lumbar regions caused her muscles to spasm. Shoulder MMT in flexion and abduction were both -3/5 and caused pain flares and tenderness through her thoracic section. She scored a 30% on her Modified Oswestry indicating a moderate disability. Her plan of care (POC) over the course of 8 weeks focused on pain modulation through ROM exercises, manual therapy, neuromuscular reeducation and ergonomic education. As pain decreased we focused on strengthening her shoulders and trunk to provide her support that she needs throughout her day. A home exercise program (HEP) targeting mid-thoracic stretching was also provided. The patient was instructed to perform this program 2-3 times a day or whenever she needed relief. By week 3 she noticed pain resolution during work and sleep and was discharged with a score of 0% on the Modified Oswestry and no pain. Her overall shoulder strength improved to a 4+/5 and she no longer needed pain medication. Patient adherence to an HEP combined with physical therapy interventions effectively reduced mid-thoracic pain in a WFH patient. These findings show the importance of an ergonomic education and preventative measures in this population.

Kathleen Ryan-Lobato, Kyle Herauf, and Adam Squires

Subject: Health, Nutrition & Clinical Sciences

Multifidus Activation Intervention for Chronic Low Back Pain: A Single Case Study in a Middle Aged Male

Chronic low back pain (LBP) is the leading cause of disability worldwide and contributes to individual and societal economic burden. Etiology is often multifactorial with variable clinical presentations, complicating the diagnosis and treatment selection. Evidence supports multifidus activation as an effective intervention for chronic LBP, though it may be underutilized in clinical practice. The purpose of this single-patient case study is to describe the examination, intervention, and outcomes of a patient with chronic LBP associated with multifidus dysfunction. The patient was a 60 year old male with a four year history of localized midline LBP. The pain interfered with his ability to lift objects, stand for long periods of time, and yard work. Baseline findings included Modified Oswestry score of 12, limited lumbar extension (5º), painful side bending bilaterally, MMT of ⅘ in bilateral hip flexion, extension, and abduction, and 0º of hip extension. Treatment focused on hip strengthening/mobility, modulating pain, and functional movement patterns. Initial interventions consisted of hip and core strengthening, lumbar spine mobilizations, instrument assisted soft tissue massage, interferential current/heat, soft tissue massage to lumbar musculature, balance training and a progressive home exercise program. He did not respond as expected to initial interventions, so segmental rolling to more specifically train the multifidus muscles was initiated. He then reported symptom improvement in the last two weeks. Lumbar extension improved to 15° and hip extension to 5° bilaterally. Hip strength remained unchanged and side bending was less painful. The patient self-discharged after reporting satisfactory improvement. No long-term follow-up was available. This case suggests that targeted multifidus activation may provide meaningful benefit when conventional manual therapy and core/hip strengthening exercises are ineffective for treating chronic LBP. Limitations include single-subject design and lack of formal discharge.

Emma Saccoman, Taylor Williams, and Ankur Padhye

Subject: Health, Nutrition & Clinical Sciences

Aquatic therapy as a solution for gait and functional mobility when upper-extremity weight-bearing restrictions limit assistive device use following polytrauma

Aquatic therapy utilizes buoyancy, viscosity, hydrostatic pressure, and thermodynamic properties to allow graded joint offloading, resistance without external loading, and improved exercise tolerance. While supported in neurologic conditions, osteoarthritis, and post-operative orthopedic rehabilitation, limited literature exists regarding its use in complex polytraumatic presentations with concurrent surgical precautions that prevent use of traditional assistive devices for gait training. The purpose of this case report is to highlight aquatic therapy as a novel intervention to facilitate gait training and functional mobility in a patient with polytrauma. This case is about a 53 year old male who sustained a left femur fracture, ribs 1–9 fractures, and a right clavicular fracture requiring surgical fixation. Postoperatively, at week 1, he was weight bearing as tolerated through the lower extremity but restricted from weight bearing through the right upper extremity, preventing walker use and limiting gait progression. The initial evaluation revealed impaired left lower-extremity loading tolerance, antalgic gait, reduced shoulder and hip range of motion, and guarded movement patterns. The Lower Extremity Functional Scale (LEFS) scores indicated severe limitation of function, with an initial score of 4/80. Aquatic therapy was initiated at 9 weeks to allow graded weight bearing and gait retraining within precautions, progressing from foundational walking and hip strengthening to dynamic balance and resisted activities over next 5 weeks. During the aquatic phase, LEFS improved to 22/80, reflecting clinically meaningful gains in functional mobility while maintaining surgical precautions. This case suggests aquatic therapy may serve as a safe starting point or alternative rehabilitation pathway in polytrauma when traditional gait strategies are limited, providing preliminary guidance in an area with minimal published research.

Carson Sadlek

Subject: Health, Nutrition & Clinical Sciences

The Role of Physical Therapists Balancing Protocols, Pain, and Overuse – a Case Report

This is a case study following physical therapy treatment of a 67 y-o female post total knee arthroplasty (TKA). She demonstrated expected impairments including pain and swelling along with deficits in range of motion and strength, causing daily and recreational activity restrictions. However, throughout treatment, additional contextual factors, such as fear avoidance behaviors, social influences, and overuse altered recovery and subsequently led to adjustments in the treatment plan, due inability to participate in recreational activities and complete activities of daily living. Treatment started by following the typical TKA protocol, which includes interventions promoting strength, range of motion, pain control, and

edema management techniques to target the earlier stated impairments focused on improving LE function. She was progressing well, but still had complaints of residual swelling, excess pain, and decreased confidence in her leg despite the targeted interventions. The plan was changed to focus on strengthening and functional activities, which yielded similar results. We later learned that the patient had been overworking her LE and was also hesitant to cause damage to her knee. This prompted another change in treatment, focusing on pain education, adequate rest and volume, as well as treating an overuse injury. The patient responded well to the last adaptation of the treatment plan, leading to ability to increase function with walking, stair negotiation, and recreational activities. This all highlights why we as clinicians need to listen and connect with the patient instead of following a protocol blindly. If we had not adjusted appropriately, the patient would have continued to overload her lower extremity, furthering complications and leading to poor results. This case discusses the importance of building rapport to understand the patient in front of you, as well as the impact that patient beliefs can have on recovery.

Pooja Sapkota, Melika Akaberi, Jordan Oman, Solomon Zeleke, Kavita Sharma, Srinath Pashikanti, and Marvin Schulte

Subject: Health, Nutrition & Clinical Sciences

SAR Guided Discovery of Positive Allosteric Modulators of α9α10 Nicotinic Acetylcholine Receptors for the Treatment of Hidden Hearing Loss

Hearing Loss affects approximately 18% of the world's population. Hidden hearing loss (HHL), characterized by hearing difficulties despite normal thresholds, impacts ever larger population with no effective treatment identified yet (Liu, Stohl, & Overath, 2024). The α9α10 nicotinic acetylcholine receptors (nAChRs) present in cochlear outer hair cells is a promising molecular target for noise induced HHL and age-related hearing loss considering its critical role in regulating synaptic transmission between efferent medial olivocochlear fibers and outer hair cells (Boero et al., 2018). We aimed to develop potent and selective positive allosteric modulators (PAMs) of α9α10 nAChRs through structure activity relationship (SAR) studies of ascorbate derivatives. Synthetic analogs of ascorbate were screened utilizing electrophysiological assays in Xenopus laevis oocytes expressing recombinant α9α10 nAChRs. We evaluated these analogs for their ability to potentiate acetylcholine (ACh) - evoked currents and determined concentration dependent efficacy (EC50). A commercially available ascorbate analog, 3-O-Ethyl L-Ascorbic Acid showed better allosteric activity for these receptors with over 275-fold increase in potency (EC50= 1.6 μM, Imax =~ 320%) compared to L-Ascorbic Acid (EC50= 400-908 μM, Imax =~280%). Notably, a novel ascorbate analog, 3-O-Propargyl-Acetonide-L-Ascorbate potentiated ACh current in α9α10 nAChRs with an EC50 value of 0.198 μM representing nearly 1000-fold increase in potency compared to ascorbate despite exhibiting lower antioxidant activity. To elucidate the binding interactions, we designed a three-dimensional homology model of α9α10 nAChRs using Schrodinger's Maestro and performed molecular docking of active ascorbate analogs. Our findings suggest that a transmembrane pocket beneath M2-M3 loop may serve as a potential binding site for PAMs of these receptors although additional sites are currently under investigation. This work contributes to targeted drug discovery for hearing disorders addressing the unmet need in hearing loss therapeutics. Further studies on receptor selectivity, potentiation mechanism, binding interactions along with pharmacokinetic studies are essential to validate its potential for therapeutic activity.

MacKenzie Saunders, Jennifer Daley-Hazekamp, and Michael Foley

Subject: Health, Nutrition & Clinical Sciences

Are they medically stable? The role of physical therapist in the acute care setting in determining medical stability in patients' post cardiac surgery: case study report

Coronary artery disease (CAD) is the leading cause of death globally. CAD leads to imbalance of myocardial supply and demand (rate pressure product). Medical management of CAD consists of restoration of coronary blood flow procedures. Pharmacological interventions are utilized to reduce myocardial oxygen consumption, i.e. beta blockers are used to blunt heart rate responses to activity. The purpose of this report is to highlight the crucial role physical therapist in the acute care setting have in assessing medical stability through the progression of mobility. Patient was a sedentary 46-year-old Caucasian female with past medical history of CAD, hyperlipidemia, diabetes, chronic obstructive pulmonary disease, along with several other comorbidities. Patient underwent a three-vessel coronary artery bypass grafts (CABG) to restore myocardial supply. Post-CABG patient experienced hypertensive episode with coughing indicating precarious medical stability, resulting in further medical assessment. Chest x-ray and lab levels revealed hematoma within the thorax and hemoglobin drop from 11 mg/dl pre-CABG x 3 to 8 mg/dl. The physician performed a redo-sternotomy to explore for blood

loss. A hematoma evacuation and cauterization were performed. Post evacuation/cauterization, the patient showed hemodynamic instability with the progression of mobility leading to further skilled care and prolonged stay. Interventions: Skilled interventions consisted of monitoring medical stability during mobilization, ambulation, and functional activity. Outcomes used in this case study were based on her functionality and ability to participate in each visit. These measures were based on distance walked, hemodynamic stability, tolerance to exercise, and assistance provide from physical therapy staff. No standard outcome measures were used by the physical therapy team throughout hospital stay. Physical therapists are the first medical professional to mobilize a patient and examine hemodynamic stability post-surgery. For that reason, it is crucial that we are assessing for medical stability through symptomology and vital signs.

Anna Schill, Emilee Martin, and Joshua Grinath

Subject: Biological & Natural Sciences

Predator impacts on an omnivorous, eusocial species and mutualistic partners in the sagebrush steppe

Omnivorous, eusocial species play vital roles in food webs of terrestrial ecosystems due to their variable, broad diets and highly efficient cooperative foraging strategies. The effect of predation on omnivorous, eusocial organisms must be considered to better understand their complex roles within food webs. For instance, it is unclear how eusocial organisms may alter their cooperative foraging to achieve proper nutrition as colonies recover from predation events. Due to the colonial nature of these species, post-predation recovery involves the production and rearing of young, which often have different diets than adults. Thatch ants, Formica obscuripes, are a prevalent omnivorous, eusocial species in sagebrush steppe ecosystems and are also preyed upon by black bears, Ursus americanus. Recovery from a bear attack likely requires energetically costly colony-wide rebuilding efforts, but it is unknown how, or if, thatch ants alter foraging to recover from this damage, which may have implications for sagebrush steppe food webs. Here, we conducted a Bear Simulation Experiment with F. obscuripes near Pocatello, Idaho, where resident bears do not occur. Six plots were established in Blackrock Canyon, where a high density of thatch ants live. Annually since 2020, a subset of nests were randomly chosen for simulated bear attacks based on data we previously collected from real bear attacks. Formica obscuripes workers form consistent foraging trails to and from nearby shrubs to forage for arthropod prey, which are fed to larvae, and to participate in food-for-protection mutualisms with hemipteran honeydew-producers, in which ants harvest honeydew for consumption by adult workers. During summer 2023, we conducted surveys to understand differences in arthropod assemblages on plants near nests which experienced simulated bear attack (n=7) and those that did not (n=26). We counted numbers of honeydew-producers, thatch ants, and other predacious arthropods that could prey on ants and honeydew-producers on plants along transects near nests and used generalized linear mixed models (GLMMs) to investigate differences between nests with and without simulated bear damage. We found no significant differences in total abundances of ants, honeydew-producers, or predatory arthropods between damaged and control nests. We are conducting further analyses to evaluate effects on insect densities on plants, ant tending rates, and plant-insect network structure. Our results heretofore suggest that relationships between thatch ants and their mutualistic partners may be resistant to bear predation in this system, which could impact the occurrence of trophic cascades and other dynamics in sagebrush steppe ecosystems.

Kathryn Schultz

Subject: Health, Nutrition & Clinical Sciences

Conservative Orthopedic Rehabilitation Following MVA Injury in a Young Adult Male with Hemophilia

Hemophilia is a hereditary coagulation disorder characterized by clotting factor deficiency and increased risk of bleeding. Musculoskeletal injuries in this population present unique rehabilitation challenges because traditional interventions may elevate bleeding risk. Evidence describing safe and effective outpatient orthopedic management following traumatic injury in individuals with hemophilia is limited, variable, and highly patient specific. A 24-year-old male with a diagnosis of hemophilia presented to outpatient physical therapy with thoracic spine and left knee pain after being sideswiped in a motor vehicle accident. Examination revealed reduced left knee flexion and reduced thoracic range of motion in all directions. The most limited thoracic motion was left rotation. Strength deficits included left knee flexion and extension. Hip flexion strength was also diminished. Thoracic spine strength testing was deferred due to pain with ROM. Tenderness over the left patellar tendon and moderate guarding in the left vastus lateralis were also noted. Knee ligament integrity tests were negative. Intake outcome measures included pain intensity on the Numeric Pain Rating Scale, Lower Extremity Functional Scale (LEFS), Modified Oswestry Disability Index (ODI), and Single Assessment Numeric Evaluation (SANE). Interventions emphasized low-grade manual therapy, repeated motion strategies, muscle energy techniques, therapeutic exercise, and modalities, while

avoiding high-grade mobilization and aggressive soft tissue techniques to mitigate bleeding risk. The patient demonstrated improvements in thoracic mobility, lower extremity strength, pain severity, and functional tolerance without adverse bleeding events. Outcome measure changes were Pain Rating Scale 4-point improvement, LEFS 18-point improvement (MCID 9pts), ODI 26% improvement (MCID 10-12%), SANE 12% improvement (MCID 10-15%), and a final score on the GROC +5 with a 5-point improvement (MCID 3pts). This case provides evidence that low-vigor manual therapy, exercise, and modalities can result in clinically significant improvements in pain and function in individuals with hemophilia presenting with musculoskeletal injuries.

Benjamin Scott

Subject: Education, Learning & Training

UME Pipeline Resolution in Idaho

Idaho currently ranks 50th in the nation for physicians per capita (Ericsson, 2025). With Idaho being a largely rural state, this physician shortage disproportionately impacts rural populations and health outcomes within this population. During the 2025 legislative session, Idaho commissioned a committee to address a shortage in physician education and explore opportunities to reduce the physician shortage through education. The Undergraduate Medical Education Committee (UMEC), focused on how Idaho can increase training capacity within the state to raise the number of physicians practicing in Idaho. This presentation will focus on the scholarly work completed by a graduate student intern collaborating with the UMEC. Including analysis of the literature and existing policy, policy briefs and other research done on behalf of the committee. Methods of this project will be discussed in relation to how artificial intelligence (AI) was ethically used in this research, how literature was selected, analyzed, and how findings were presented to the committee. Results of this project include both long-term and short-term recommendations to healthcare education and for physician training within the state of Idaho. For each of the proposed solutions, implementation details and logistics were explored and documented. In January 2026, the overall findings and recommendations of the UMEC were published by the Idaho State Board of Education and submitted to the Idaho Legislature and the Office of the Governor.

Andrija Sevaljevic

Subject: Education, Learning & Training

Design and Implementation of a Reusable Web-Based Visualization System for Algorithmic and Logical Problem Solving

This thesis presents the design and implementation of a web-based visualization platform that supports interactive, step-by-step exploration of algorithms and computational problem domains. The system enables visualizations of algorithms, sets, Boolean satisfiability (SAT) instances, and graph-based problems within a unified and reusable framework. Unlike many existing tools that require specialized visual implementations for each problem type, this platform provides a common template—particularly for graph structures—that can be reused without modification, reducing development overhead and promoting extensibility. A key contribution of this work is support for multiple synchronized visualizations of a single problem instance. Users can observe algorithm execution alongside structural and logical representations, enabling deeper insight into how intermediate states evolve over time. The platform's modular architecture allows new problem types and visualization strategies to be integrated without altering the core system design. The system is implemented as a modern web application using centralized state management to ensure consistency across visual components and to support deterministic step-by-step execution. This design facilitates clarity, reproducibility, and ease of extension. By combining reusable visualization templates, synchronized multi-view representations, and interactive algorithm tracing, this work contributes a scalable framework for educational and research applications in computer science. The platform demonstrates how generalized visualization infrastructure can reduce complexity while enhancing conceptual understanding of computational processes.

Janhabee Shrestha, Blue Hill, Elizabeth Kaweesa, and Solomon Zeleke

Subject: Biological & Natural Sciences

Rational Development of CDK2/4/6 Triple Inhibitors to Mitigate Resistance and Expand Clinical Applications

Selective targeting of cyclin-dependent kinases 4 and 6 (CDK4/6) has significantly improved the management of metastatic breast cancer, leading to meaningful gains in patient survival. However, resistance often arises through compensatory upregulation of CDK2, which restores cell-cycle progression despite sustained CDK4/6 inhibition. Conversely, selective

suppression of CDK2 may reactivate CDK4/6, highlighting a reciprocal kinase-switching mechanism that enables tumor adaptation and therapeutic escape. This dynamic interplay supports the rationale for simultaneous inhibition of CDK2 and CDK4/6 to overcome resistance and improve efficacy in CDK2-dependent malignancies. To address this unmet need, we developed a novel thiazolyl-pyrimidine chemotype that potently inhibits CDK2/4/6 while sparing CDK1, CDK7, and CDK9. These latter kinases are considered key anti-targets because of their indispensable functions in cell-cycle regulation and transcriptional control; their inhibition is often linked to dose-limiting toxicities. By maintaining selectivity over CDK1, CDK7, and CDK9, our scaffold preserves strong antiproliferative effects while reducing the likelihood of systemic toxicity. A focused analogue series yielded compounds with Ki values below 100 nM and GI_{50} values under 5 μM in selected breast and ovarian cancer cell lines. Compounds 40, 41, and 43 emerged as balanced, high-potency CDK2, CDK4, and CDK6 inhibitors with pronounced antiproliferative activity. Notably, these agents demonstrated minimal cytotoxicity in non-malignant WI-38 and MRC-5 fibroblasts (GI_{50} > 10 μM), supporting a favorable therapeutic window. In addition to their therapeutic promise, selective CDK2, CDK4, and CDK6 inhibitors provide powerful chemical biology tools for interrogating CDK-driven signaling networks.

Rachel Sutherland, John Dudgeon, and Kirsten Green Mink

Subject: Humanities, Behavioral & Social Sciences

From Follicle to Foundation: Establishing a Comparative Microscopic Hair Reference Collection

As a biological material, hair contains substantial information but is underutilized as a resource for research and investigations. The internal and external structure of hair varies in pattern, shape, and size according to needed function and care practices. Hair can provide indicators of stress, diet, mobility, and ecological and environmental conditions. Microscopy is a useful method for taxonomic identification of animal hair and characterization of human hair. Microscopic analyses, commonly optical microscopy (OM) and increasingly, scanning electron microscopy (SEM), offer highly-resolved imaging of hair size, hair condition, surface residues, cuticle scale pattern, and internal structure. This project employs lengthwise morphological analyses using both OM and SEM imaging focused on structural differences that assist in classification. For animals, this involves taxonomic identification of hair at the family or species level. For human hair, the analysis is more exploratory and is focused on cataloging basic characteristics that may change with lifestyle decisions. This work will establish a multi-dimensional resource of both human and North American mammalian faunal hair specimens with applications in environmental sciences and wildlife conservation, archaeological research, and forensic investigation. That resource will include a hair comparative collection that will be permanently housed at Idaho State University designed for long-term internal and external research accessibility. Our updated classification system and comparative collection will be a valuable reference tool and diagnostic manual for future cross-disciplinary research and medico-legal investigation.

Jaron Taylor and Devin Bean

Subject: Health, Nutrition & Clinical Sciences

Restoring Movement Symmetry Through Powerlifting-Based Rehabilitation in a Patient With Multisite Pain: A Case Study

Powerlifting movements are commonly used to build global strength across major muscle groups. Although improper or aggressive loading can be the cause of musculoskeletal pain, these compound moves can serve as a valuable rehabilitation tool when applied safely and progressively. The global neuromuscular demands of these movements may be particularly useful in patients presenting with movement impairments. This case study describes the use of a powerlifting-based rehabilitation program to address movement asymmetry in a patient with multisite pain. A 46-year-old deconditioned male presented with chronic low back pain and concurrent neck, shoulder, and knee pain. Movement analysis revealed asymmetry during squatting and hip hinging, with consistent left-sided weight shifting and postural deficits. The patient reported perceived unilateral weakness, but manual muscle testing discovered bilateral lower extremity weakness (3+/5) and impaired core strength. Baseline pain was reported as 8/10 on the Numeric Pain Rating Scale. The patient completed a 6-week rehabilitation program focused on progressive training in the squat, deadlift, bench press, and power clean. Treatment sessions occurred three times per week. Emphasis was placed on maintaining bilateral symmetry, corrected posture, and core activation during lifts, and load was increased based on patient tolerance. By week 6, the patient demonstrated improved movement symmetry, increased global strength, and pain reduction from 8/10 to 1/10. The patient reported increased confidence with lifting and continued independent training following discharge. This case suggests that powerlifting-based rehabilitation may be an effective way to correct movement asymmetry and address multisite

musculoskeletal pain. These compound movements, when applied progressively and safely, may be a more efficient alternative to region-specific approaches when multiple areas are involved. Further research is warranted to determine wider applicability.

Matthew Thurston, Doug Winward, and Tarang Jain

Subject: Health, Nutrition & Clinical Sciences

Early Atypical Sensory Presentation as a Sentinel Sign After Total Hip Arthroplasty: A Case Study

Total hip arthroplasty (THA) rehabilitation typically follows a predictable trajectory. However, early clinical indicators of mechanical complications remain poorly defined. This case describes a 56 year old female status post right THA for degenerative joint disease who reported an atypical sensory perception during early ambulation, repeatedly describing the operative hip as feeling “spongy.” The sensation persisted beyond expected anesthetic effects and was inconsistent with typical postoperative pain or weakness. Although initial imaging appeared acceptable during surgery, the continued abnormal sensory report prompted ongoing clinical monitoring and interdisciplinary communication. After discharge, the patient returned with unresolved symptoms, and advanced imaging revealed prosthetic malposition requiring revision THA. Her postoperative course was further complicated by surgical site infections, resulting in a nonlinear rehabilitation trajectory marked by repeated functional decline and recovery. Despite these challenges, structured inpatient rehabilitation focusing on mobility, transfers, strengthening, and endurance ultimately enabled safe discharge home. This case suggests that early qualitative sensory changes following THA may represent a clinically meaningful signal rather than benign postoperative variability. Attentive interpretation of atypical patient reported sensations, paired with therapist driven surveillance and communication, may support earlier identification of complications and more responsive postoperative management.

Amanda Travis, Adam Squires, Ashley Bergerson, and Sam Maleki

Subject: Health, Nutrition & Clinical Sciences

Interventions resulting in a return to sport post-discectomy in a young athlete: A single case study

Chronic lumbar spine pain is common and can significantly impact quality of life and social, work, and athletic activities. A lumbar discectomy can be an option in some cases to relieve symptoms. The purpose of this case study is to describe the treatment and outcomes of a patient with chronic low back pain post discectomy who was able to return to competitive volleyball. The patient is a 28-year-old male presenting with low back pain status post L5-S1 discectomy 6 weeks prior. He had completed conservative treatment prior to surgery without resolution of symptoms. He reported pain with squatting and lifting, occasional nerve pain into the left glute and posterior thigh, and difficulty returning to competitive volleyball. Objective findings included limited and painful lumbar ROM in all directions and a positive straight leg raise, suggesting nerve mechanosensitivity. The patient was deemed appropriate for physical therapy and a plan was developed to address the identified impairments. Outcome measures included pain scale, ROM, and strength testing. Treatment emphasized pain modulation through manual therapy techniques, lumbar and hip mobility exercises, progressive core stabilization exercises, and sport-specific training. Each outcome measure improved after treatment, indicating reduced pain, improved mobility and function, and safe return to sport. In conclusion, this case demonstrates that manual therapy for pain modulation combined with a progressive exercise program effectively restored function after lumbar discectomy in a young, active patient. Clinically, this supports a phased, multimodal rehabilitation approach to optimize outcomes and facilitate safe return to activity following lumbar discectomy.

Riley Trovillion, Michael Baumgarten, and Adam Squires

Subject: Health, Nutrition & Clinical Sciences

Psychosocial Benefits of Patient Education in Chronic Low Back Pain: Single Case Study

Chronic low back pain (CLBP) leads to both physical and psychosocial impairments, including functional limitations, fear of reinjury, and reduced self-efficacy. Evidence supports patient education as a component of physical therapy to address maladaptive beliefs, improve adherence and enhance recovery. This case study demonstrates how individualized, research-informed patient education with targeted interventions improve psychosocial outcomes and functional mobility in a patient with acute recurrent CLBP. A 38-year-old female presented with an acute episode of CLBP following an increase in walking and lifting. She reported having difficulty with bending, twisting, prolonged sitting and her current weightlifting routine. The patient presented with psychosocial barriers including fear-avoidant behaviors and reduced confidence in

movement. Pain rated as severe with mild self-reported disability. Examination was consistent with mechanical low back pain (LBP), including movement related pain, lower extremity weakness and neural mechanosensitivity. Screening for serious pathology was negative. The patient completed five outpatient physical therapy sessions consisting of individualized patient education and progressive therapeutic exercise. Interventions were directed toward restoring functional movement, improving strength, and gradually reintroducing activity. Patient education focused on applying evidence-informed principles to pain management, movement confidence, and safe return to activity. Patient's pain resolved completely, with full function and no reported disability. Functional gains included the restoration of lumbar extension/flexion tolerance, resolution of radicular symptoms, and progression from pain limited movement to loaded functional tasks without symptoms. By discharge, she could lift and carry her toddler, return to weightlifting and sit for prolonged periods without limitation. Individualized, research-informed education with targeted interventions may reduce pain, psychosocial barriers and functional limitation in recurrent CLBP. Graded functional exercises may have helped with safe return to activity. Education likely improved self-efficacy and confidence, which highlights the importance of patient-centered psychosocially informed care.

Emme Tucker

Subject: Humanities, Behavioral & Social Sciences

The Pressure to Be Perfect: Perfectionism, Eating Pathology, and the Moderating Roles of Self-Esteem, Body Dissatisfaction, and Social Support in College Student Athletes and Non-Athletes

Perfectionism is a multidimensional trait linked to vulnerability for disordered eating, particularly during emerging adulthood when academic, social, and body-related pressures intensify. College students, both athletes and non-athletes, face unique performance and appearance demands that may shape how perfectionistic tendencies influence eating behaviors. The present study will compare perfectionism, disordered eating, self-esteem, body dissatisfaction, and perceived social support among undergraduate athletes (n = 125) and non-athletes (n = 125). Participants will complete validated self-report measures regarding these variables, as well as demographic information. Proposed statistical analyses will include MANOVAs to test group and sex differences, as well as moderation and moderated moderation models using PROCESS for SPSS. It is expected that athletes will report higher self-oriented perfectionism, self-esteem, and perceived social support while non-athletes will report higher socially prescribed perfectionism, disordered eating, and body dissatisfaction. Moderation analyses will examine whether self-esteem and social support serve as protective factors, while body dissatisfaction exacerbates risk, with patterns expected to differ across groups. This study aims to clarify how perfectionism and related psychosocial factors contribute to eating pathology, informing prevention and intervention efforts for college student populations.

Sydney Walsh and James Ralphs

Subject: Health, Nutrition & Clinical Sciences

Fear Avoidance as a Barrier to Early Postoperative Total Shoulder Arthroplasty Rehabilitation - A Single Case Study

Total shoulder arthroplasty (TSA) utilization is increasing in the United States, with generally favorable outcomes following postoperative outpatient physical therapy (PT) focused on pain control, restoration of range of motion, and functional progression. However, rehabilitation adherence may be disrupted by fear-avoidance–related behaviors (FARB), including movement apprehension, guarding, and hypersensitivity, which have been associated with heightened pain and disability. While well described in chronic pain populations, limited evidence exists regarding FARB following TSA. This case study describes an atypical early postoperative PT presentation characterized by FARB following TSA. The patient was an adult female evaluated one week following TSA on her non-dominant, right arm secondary to a work-related fall. She reported constant right upper extremity pain (7/10 best,10/10 worst), distal paresthesia, continuous sling use, and complete avoidance of shoulder movement due to fear of reinjury. PT evaluation revealed severe guarding, hypersensitivity to movement, inability to tolerate supine positioning, refusal of shoulder passive range of motion, limited elbow motion (lacking 70° extension), and severe functional limitation (QuickDASH 55/55). Intervention: In addition to standard PT interventions for TSA, a biopsychosocial approach was incorporated, utilizing patient education, reassurance, and graded movement exposure. Due to FARB, PT interventions progressed gradually from supported positioning and distal mobility to supervised passive and active-assisted shoulder motion as tolerance improved over the course of five weeks. The patient demonstrated improved tolerance to positioning and movement, reduced guarding, improved elbow extension to near full range, and

increased participation in shoulder mobility. This progression was slower than expected for typical early TSA rehabilitation. This case highlights how FARB may significantly delay early PT rehabilitation following TSA. Early identification and targeted management of FARB may optimize postoperative outcomes compared to approaches that do not address these behaviors.

Caleb Warnken

Subject: Health, Nutrition & Clinical Sciences

The Effect of Progressive Resistance Exercise and Instrument Assisted Soft Tissue Mobilization on Greater Trochanteric Pain Syndrome: A Case Study

Although there is debate about the pain generator in greater trochanteric pain syndrome (GTPS), it has been suggested that gluteal tendinopathy is the most likely cause. The gold standard for treating tendinopathies is progressive resistance exercise (PRE). Literature also supports the use of instrument assisted soft tissue mobilization (IASTM) for treating pain in tendinopathies. The purpose of this case study is to examine the effect that a multimodal approach including PRE, IASTM, and patient education has on a patient with GTPS. The patient was a 61-year-old female presenting with pain in her lateral right hip that was aggravated with prolonged sitting, walking, or side lying. She reported pain of 4/10 at rest and 7/10 at worst on the Numeric Pain Rating Scale. She was tender to palpation at the right greater trochanter and had pain with passive right hip adduction to end range. Manual muscle testing showed weakened hip extension (3+/5) and hip abduction (3+/5) bilaterally. The outcome measure Focus on Therapeutic Outcomes (FOTO) was initially scored 53. Interventions included PRE targeting the lower extremities and core musculature, IASTM to the right gluteus medius and minimus musculotendinous units, and patient education. A progressive home exercise program was also prescribed. At discharge, pain was a 0/10 at rest and a 1/10 at worst. Manual muscle testing strength improved for hip extension (4+/5) and hip abduction (4+/5) and were pain-free. The FOTO score improved to a 71, demonstrating a significant improvement in function. The results of this study suggest that a multimodal approach including PRE, IASTM, and patient education led to clinically significant improvements in pain, strength, and function. Further research is necessary to evaluate these findings in larger populations.

Hollee Warren

Subject: Health, Nutrition & Clinical Sciences

Interactive light board training for sensorimotor integration in Post-Traumatic Parkinsonism: a single-case report

Post-traumatic parkinsonism (PTP) is a rare movement disorder following traumatic brain injury (TBI) characterized by bradykinesia, gait dysfunction, tremors, and postural instability. Unlike idiopathic Parkinson's disease, PTP often lacks clear structural involvement of deep brain nuclei, which complicates rehabilitation due to variable clinical presentation and limited evidence-based literature. This case report examines the feasibility of using interactive light board training to address sensorimotor integration deficits in PTP. A 52-year-old male presented six months post-TBI with a recent PTP diagnosis for a 12-week multimodal physical therapy plan focused on gait, balance, stair negotiation, and activity tolerance. Previous vestibular and balance therapy yielded minor functional improvement. Sensorimotor integration, motor coordination, and movement initiation were addressed with the Vision Coach® interactive light board training. Vision Coach® training required rapid visual scanning and timed upper extremity responses to random targets in standing. Progression involved increasing stimulus speed and encouraging quicker movements. Vision Coach® training completion time decreased by ~10 seconds (14.7%). Intervention was well tolerated without reports of fatigue. Mild improvements in stair negotiation, coordination, and movement speed were reported. However, freezing episodes continued. Outside of intervention completion time, no standardized outcome measures were completed. This case introduces the feasibility of LED-based light board training for improving reaction time and movement initiation in PTP. Integrating visually driven tasks may effectively stimulate change in motor timing and coordination. MDC and MCID values for Vision Coach® training are undetermined. Additionally, standard, population-specific values for Vision Coach® training are not established. While efficacy remains difficult to conclude, this study highlights potential and the need for further investigation into the potential use of interactive light board training for patients with PTP.

Bryndel Young, Adam Squires, and McKenzie Karl

Subject: Health, Nutrition & Clinical Sciences

Redirecting Shoulder Interventions Through PT Clinical Reasoning: A Case Study

Research demonstrates that aligning interventions with a patient's presentation improves patient outcomes. Therefore, a thorough, evidence-based examination is essential to guide clinical decision-making. This case report illustrates how clinical reasoning informed intervention selection in a patient referred for biceps tendinopathy, but presented with findings more consistent with chronic shoulder instability and degenerative changes. A 56-year-old male presented with a chief complaint of left shoulder pain. He reported multiple prior traumatic dislocations but denied a specific mechanism of injury related to his current symptoms. A comprehensive subjective and objective examination was performed. Patient-reported outcome measures included the Numeric Pain Rating Scale (NPRS) and the Upper Extremity Functional Index (UEFI). Objective assessment evaluated rotator cuff and biceps integrity, as well as shoulder stability, strength, and range of motion (ROM). Based on examination findings, interventions focused on global shoulder strengthening and stabilization. Baseline examination revealed significant pain at rest that increased with movement, limited range of motion in all planes, positive findings on shoulder instability testing, tenderness to palpation over the anterior shoulder, and signs consistent with rotator cuff pathology and degenerative changes. Following evidence-based intervention, the patient demonstrated modest strength gains and slight improvements in passive ROM. However, active ROM and UEFI scores remained unchanged. Subsequent MRI findings confirmed the suspected differential diagnoses, reinforcing the clinical decision-making that guided the plan of care. This case illustrates how a comprehensive examination leads to more targeted interventions appropriate to the patient's specific limitations. Effective clinical reasoning is essential for PTs to conduct thorough evaluations, differentiate among potential diagnoses, and make evidence-based decisions that optimize patient outcomes.

Chloe Young

Subject: Humanities, Behavioral & Social Sciences

Narrative Elicitation in Children with Language and Literacy Impairments: Effects of Stimuli Type and Verbal Model

Narrative language sampling is a widely used method for assessing language skills in children with language impairment. A critical variable influencing narrative quality is whether a verbal model accompanies the elicitation stimuli. Prior research has yielded mixed findings, and most studies have focused on typically developing children rather than those with language and/or literacy impairments (LLI). Klop and Engelbrecht (2013) found no significant differences in narrative quantity or quality between animated and static conditions in typically developing third graders when no verbal model was provided. In contrast, Diehm et al. (2020), which included a verbal model, found that preschoolers produced longer and more complex narratives in the animated condition, suggesting that combined auditory and visual input supports richer narrative production. Most recently, Cochran (2024) identified trends toward longer narratives in the animated condition for children with typical language, but not for children with LLI, suggesting that children with LLI may lack sufficient language skills to benefit from animated stimuli alone and may require a verbal model to do so. The present study examines narratives elicited from 28 children ages 8–12 with LLI, including those with developmental language disorder (DLD), written language disorder, or both. Fourteen children were assigned to conditions with a verbal model (animated and static) and 14 to conditions without a verbal model. Narratives will be analyzed for macrostructure, productivity, syntactic complexity, and lexical diversity. It is hypothesized that children whose narratives were elicited using animated stimuli paired with a verbal model will demonstrate the strongest overall narrative performance. Findings will inform clinical decisions about optimal elicitation methods for assessing narrative abilities in children with LLI. Data analysis is currently in progress.

Doctor of Pharmacy and Health Resident Abstracts

Mitchell Allen
Subject: Health, Nutrition & Clinical Sciences

COVID-19 impact on the mental health of medical students

Medical students are expected to adapt to the rigors of medical school by reprioritizing their lives, dramatically changing daily habits to accommodate for demanding academics. These changes can induce or worsen depression and anxiety as the lifestyle of medical students change. The purpose of this poster is to identify possible changes in anxiety and depression during the COVID-19 Pandemic. A cohort of first- and second-year medical students was evaluated longitudinally using survey methods for depression and anxiety. Data was evaluated at 6 time points in the academic year using generalized linear models. Data was obtained prior to the onset of the COVID-19 pandemic, and during the pandemic. Depression, anxiety, and sleep habits displayed a cyclical change that was associated with the academic cycle. The effect of the COVID-19 pandemic was never significant. The main driver for depression and anxiety for medical students was the academic cycle, while the COVID-19 pandemic did not have an impact on mental health.

Kristen Caldwell, John Holmes, and Jordan Ferro
Subject: Health, Nutrition & Clinical Sciences

Implementation of a Venous Thromboembolism (VTE) Prophylaxis Protocol in an Ambulatory Oncology Center

Patients with cancer are at increased risk of venous thromboembolism (VTE), particularly within six months of diagnosis. The 2025 National Comprehensive Cancer Network (NCCN) Cancer-Associated VTE guideline recommends at least 6 months of anticoagulation for most solid tumor patients with a Khorana risk score (KRS) above one. VTE prophylaxis rates in ambulatory oncology remain low, highlighting the need for standardized risk assessment and education. An NCCN-aligned VTE prophylaxis protocol was implemented at a regional ambulatory oncology center to improve assessment consistency and appropriate prophylaxis use. An August 2024 - March 2025 retrospective chart review assessed baseline KRS assessments, prophylaxis, and 6-month VTE rates. January 2026, an NCCN-aligned protocol was implemented at a regional ambulatory oncology clinic. Included are new solid tumor or lymphoma diagnoses starting chemotherapy, immunotherapy, or endocrine therapy. Excluded are primary or metastatic brain/CNS tumors, hematopoietic cancers, prior systemic therapy, or anticoagulation use/contraindication. During chemotherapy plan reviews, an oncology pharmacist calculates the KRS; a score above one prompts a prophylaxis recommendation. Providers discuss VTE risk and anticoagulation risks and benefits at the pre-chemotherapy visit. Anticoagulation is monitored routinely with reassessment at 6 months. Primary outcomes are rates of documented KRS assessment and appropriate prophylaxis. Secondary outcomes include 6 month VTE rates, appropriate discontinuation due to contraindications, and documentation of 6 month reassessment. Post-implementation data collection and quantitative analysis are ongoing. 55 of 208 patients reviewed retrospectively qualified for KRS assessment. Zero had documented systematic risk assessment or prophylaxis. Twelve met criteria for prophylaxis; one had a VTE. Among 43 who didn't qualify, two had a VTE. Twelve patients have been screened post-implementation.

Mary Cutright, John Holmes, Jordan Ferro, and Kasidy McKay
Subject: Health, Nutrition & Clinical Sciences

Enhancing Osteoporosis Management: An Emphasis on Bisphosphonate Optimization

In 2024, approximately 19.7% of adults worldwide have osteoporosis and 40.4% have osteopenia. Osteoporotic fractures are associated with increased morbidity, mortality, psychological distress, loss of independence, and substantial economic burden. The primary objective of this quality improvement project is to identify and intervene on patients being treated with bisphosphonates who require a drug holiday, resumption of osteoporosis therapy after a drug holiday, discontinuation or adjustments of bisphosphonates due to contraindications, or in need of a follow-up DEXA scan. This quality improvement project is being conducted at an FQHC that serves as a family medicine residency training clinic and provides approximately 20,500 patient visits per year. The electronic health record (EHR) was queried to identify patients over the age of 18 with an active diagnosis of osteoporosis and/or osteopenia who were prescribed a bisphosphonate or denosumab, as well as those who were not prescribed pharmacologic therapy, between July 1, 2020 and July 1, 2025. A retrospective EHR review was

conducted to evaluate renal function, total duration of bisphosphonate therapy, projected date for consideration of a drug holiday, date of most recent DEXA scan, date for repeat DEXA scan, baseline vitamin D levels, and documentation of calcium and vitamin D supplementation. For patients without an active prescription for osteoporosis or osteopenia, FRAX and T-scores were collected to assess eligibility for potential initiation of therapy. Descriptive statistics will be used to describe the appropriateness of therapy and effects of the pharmacist-led intervention. Data collection and analysis are in progress. Results will describe the prevalence of appropriate bisphosphonate use and follow-up for DEXA scans.

Gracie Garringer, Tom Wadsworth, Jen Adams, Kevin Cleveland, Rikki Trussel, and Elaine Nguyen

Subject: Health, Nutrition & Clinical Sciences

Community Pharmacy Prescribing to Close Gaps in Patient Care

Idaho is designated as a Health Professional Shortage Area (HPSA) and Medically Underserved Area/Population (MUA/P) in primary care and mental health services. The state is ranked 50th nationally in physicians/capita. Medical access challenges can be exacerbated by a shortage of primary healthcare providers, particularly in rural areas. Limited provider availability can result in extended waiting times to receive care. Medical care delays may lead to patients running out of medication refills. Abruptly stopping medications or taking them not as prescribed can lead to medical complications. Pharmacists in Idaho hold full practice authority under the standard of care regulatory model, positioning them to address healthcare needs such as gaps in care, including medication access. Community pharmacies offer increased accessibility due to extended operating hours, geographic proximity, and walk-in availability. Pharmacists can assess patients, apply clinical judgment, and when appropriate, provide short-term prescriptions and initial therapies so that continuous pharmacotherapy can be maintained. Although community pharmacist prescribing has the potential to impact medication nonadherence issues, further characterization of these services are needed. Evaluating the use and impact of these services has the ability to drive further implementation and policy development. Using a retrospective descriptive design, this study will analyze a de-identified prescription claims dataset from Bengal Pharmacy - a small independent pharmacy operating five dispensing sites throughout Idaho. The primary objectives are to identify the volume of encounters and types of medications that pharmacists addressed gaps in care between 2021-2025. The secondary objective is to compare adherence measures between the prescribing intervention to that if there was no pharmacist encounter. Though results are still pending, community pharmacist prescribing may be a solution to gaps in care. Additional studies should explore impact on clinical outcomes, resource allocation, and reimbursement of these services.

Kerrin Kramer, Jordan Ferro, and John Holmes

Subject: Health, Nutrition & Clinical Sciences

Evaluating Clinical Inertia in GLP-1 Receptor Agonist Initiation and Titration in a Federally Qualified Health Center

Treatment optimization in chronic disease management, particularly in type 2 diabetes, is often suboptimal and contributes to poor patient outcomes. GLP-1 receptor agonists (GLP-1 RAs) are guideline recommended therapies that improve glycemic control, support weight reduction, and reduce cardiovascular risk. However, approximately 85% of patients remain on doses that have not been optimized due to factors such as side effects, clinical inertia, and other barriers. Provider education, pharmacist-led interventions, and standardized titration protocols have shown success in dose optimization. This quality improvement project aims to evaluate and improve the optimization of GLP-1 RA therapy for patients with type 2 diabetes receiving care at a federally qualified health center (FQHC). This quality improvement project is being conducted at a FQHC that serves as a family medicine residency training clinic and provides approximately 20,500 patient visits per year. Eligible patients include those with one or more clinic visits in the past 15 months (June 2024 - September 2025) and an active prescription for liraglutide, dulaglutide, semaglutide, or tirzepatide. A chart extraction tool has been developed to determine which patients may be eligible for medication optimization. Descriptive statistics will be used to determine the prevalence of suboptimal GLP-1 RA therapy. Barriers to GLP-1 RA therapy optimization will also be identified and described qualitatively. Data collection and analysis are in progress. Results will describe the prevalence of suboptimal GLP-1 RA use and identify barriers to optimization in a FQHC.

Victoria Pham and Joseph Davies

Subject: Health, Nutrition & Clinical Sciences

Pilot of an Adapted Drug-Induced QTc-Prolongation Outpatient Polypharmacy Screening Tool

QTc-prolongation (QTP) is the best surrogate marker for the development of Torsades de Pointes, a life-threatening ventricular arrhythmia which can lead to cardiac arrest and sudden death. Monitoring for QTc-prolonging medications (QPM) is just one facet of conducting a drug utilization review done by pharmacists; however, there are currently no practice guidelines for monitoring parameters for multiple QPMs. This intervention aims to pilot an outpatient screening algorithm to enhance safety among geriatric polypharmacy. This was a single-site, prospective, interventional study conducted at a long-term care (LTC) pharmacy from June 30, 2025 to July 18, 2025. It piloted an adapted Tisdale scoring system, a validated inpatient QTP screening tool, for the outpatient setting. Patients were assigned an adapted Tisdale score based on the number of risk factors they had. Those patients deemed high-risk for QTP were identified and their prescribing provider notified via fax of patient-specific factors making them eligible for follow-up ECG monitoring. Outcomes of interest were number of direct provider responses and number of patients with change in therapy to their offending agent. Descriptive statistics were used with data reported as counts and percentages. A total of 813 patients were screened based on initial status of taking ≥1 high-risk QPM. Screening identified n=27 patients in most need of a clinical intervention. From this cohort, patients were categorized into three sub-groups. Subgroup A contained n=13 who had an adapted Tisdale score of 9 and total risk severity score ≥5. Subgroup B was comprised of n=4 who had an adapted Tisdale score of 8 and total risk severity score ≥5. Subgroup C consisted of n=10 who had QTP polypharmacy from ≥2 prescribers. In response, there were 3 direct prescriber responses and 6 dose reductions. The clinical intervention effectively successfully triggered medication therapy modifications, enhancing safety and overall health.

Ashley Quigg, Zachary Rosko, Mary Nies, and Elaine Nguyen

Subject: Health, Nutrition & Clinical Sciences

A needs assessment on comparative clinical effectiveness research (CER) knowledge and experiences in pharmacy professionals and health sciences faculty

With ongoing regulatory advancements, there are increased opportunities for pharmacy professionals to provide health care services. However, more patient-centered comparative clinical effectiveness research (CER) is required to enact and progress implementation, delivery, and the overall impact of pharmacy services. This project evaluated knowledge and experiences with CER among pharmacy professionals and health sciences faculty in Idaho and Alaska. Cross sectional electronic surveys were utilized to evaluate the knowledge and experiences with CER among pharmacy professionals (i.e., pharmacists and pharmacy technicians) and health sciences faculty at an academic institution. The ~15-minute survey collected background information, knowledge levels regarding CER concepts, as well as research barriers, facilitators, and interests. Surveys were electronically distributed via email beginning in late January 2025 and responses were accepted through April 2025. Descriptive statistics were used to analyze data with results reported as counts and percentages. There were 17 pharmacy professional respondents and 16 academic faculty respondents. Less than half of pharmacy professionals had previous research or quality improvement (QI) experience while ~60% of faculty reported having experience. Most pharmacy professionals reported slight knowledge with CER concepts while most faculty respondents reported moderate knowledge of CER concepts. Reimbursement for research-related activities was the biggest barrier for pharmacy professionals and time constraints overall was the biggest barrier for faculty. Previous research-related experience and education or training were facilitators of interest in research participation. Across all respondents, intellectual curiosity was a top reason for considering research participation. These findings suggest a clear opportunity to build CER capacity, including knowledge and infrastructure support. Additional opportunities may exist to foster collaborative research networks between pharmacy professionals, faculty researchers, and other clinicians to help facilitate future CER.

Brittanee West

Subject: Health, Nutrition & Clinical Sciences

Postpartum Thyroiditis Unmasking an Underlying Bipolar Disorder: A Case Report

Postpartum thyroiditis (PPT) is a thyroid disorder that occurs within the first year after childbirth, characterized by an initial thyrotoxic phase followed by a hypothyroid phase. The overlap between thyroid dysfunction and psychiatric symptoms in postpartum women is clinically significant, especially in severe cases, when PPT may contribute to or exacerbate mental health problems. Although the exact mechanisms are not fully understood, thyroid dysfunction is hypothesized to contribute to psychiatric symptoms through hormonal effects on neurochemical pathways and mood regulation. A 37-year-old female patient who was four months postpartum, with a significant medical history of PPT, presented with concerns for bizarre behavior, including insomnia, paranoia, delusional thought content, and auditory hallucinations. The patient's history is notable for episodes of PPT that had occurred with prior pregnancies. During prior episodes of thyroiditis, the patient displayed mildly bizarre behavior and insomnia, which quickly resolved with thyroid supplementation and did not require long-term thyroid replacement. At presentation, she was taking levothyroxine, yet her psychiatric symptoms continued to worsen. She required psychiatric hospitalization and treated with a low-dose antipsychotic that was titrated over her stay. She was discharged with a working diagnosis of bipolar disorder with consideration of postpartum psychosis. It was hypothesized that her postpartum thyroiditis exacerbated symptoms like insomnia and activation, potentially unmasking an underlying bipolar disorder. This case illustrates the possible connection between postpartum thyroiditis and mood disorders. Recognition of PPT as a potential precipitating factor in postpartum psychiatric presentation is critical in providing adequate mental health care.

Undergraduate Abstracts

Brinlee Adams and Aaron Barlow

Subject: Engineering, Physical & Mathematical Sciences

The Use of Heterogeneous Zeolite Catalysts in the Prins-pinacol Reaction

The Prins-pinacol reaction is used to stereospecifically synthesize substituted tetrahydrofurans. The reaction, discovered by Mousset in 1969, was further researched by Overman using Lewis acid catalysts such as SnCl4 and BF3. This project uses safer and more sustainable zeolite catalysts in lieu of traditional Lewis acid catalysts to catalyze this rearrangement. Initial reactions performed using either traditional reflux or a flow reactor had conversions up to 95% as determined by H1 NMR. The substrate scope was expanded to include new substrates that varied in substituent size, further impacting the stereochemistry and products that could be formed. One-pot synthesis reactions utilized two different zeolite catalysts and had conversions up to 58%. Further work includes continuing to expand the substrate scope, adjusting and optimizing one-pot synthesis reactions to achieve high conversions, improving the use of the flow reactor, and determining the effect pore size has on the stereochemistry of the final product.

Cadence Andrus and Kristin Lane

Subject: Biological & Natural Sciences

Laboratory observed lumefantrine tolerance in Plasmodium falciparum

The ability of Plasmodium falciparum to rapidly develop resistance to anti-malarial drugs has been a consistent hurdle in global-malaria control. Resistance to lumefantrine has become significant in Uganda, growing the need for characterization of lumefantrine resistance mutations. Such identification will contribute to the understanding of the resistance mechanism and future drug development. Thus far, selection for lumefantrine drug resistance in lab strains has not been accomplished. However, over an eight month period we have seen phenotypic success of tolerance in the lab strain Dd2 and the Dd2-R539T mutant in the kelch13 gene, conferring reduced lumefantrine susceptibility. We are using a long term, stepwise increase in drug concentrations, starting with 2.5 nM lumefantrine pressure, and increasing in 2.5 nM increments. Cell pellets are being collected after every 10 nM increase in concentration. This process will continue until we have reached ten times the inhibitory concentration. After collection of cell pellets, whole genome sequencing will be performed, and associated resistance gene mutations will be identified. The discovery of resistance genes to lumefantrine will advance the broader question of resistance mechanisms in Plasmodium falciparum, aiding in the campaign of malaria control.

Lizbeth Arellano Santoyo, Aubrey E. Skinner, Aidan F. Martin, and Michele R. Brumley

Subject: Biological & Natural Sciences

Use of a neonatal rat model in behavioral studies to investigate neural plasticity and recovery of function

Our Developmental Behavioral Neuroscience lab uses a neonatal rat spinal cord injury model (SCI) to better understand behavioral plasticity supported by spinal cord mechanisms, specifically with the role of sensorimotor feedback and training in recovery facilitation. We are conducting two studies using this model to investigate neural plasticity and functional recovery in behavioral experiments. One study looks at how daily step training on a treadmill impacts the development of sensorimotor reflexes and weight-bearing locomotion. The second study compares hindlimb weight-bearing in rats using a system which measures dynamic weight bearing (DWB) via sensors vs spontaneous locomotion in an open field. On postnatal day 1 (one day after birth), rats undergo a spinal cord transection surgery (experimental group) or a sham surgery (control group). First, subjects are anesthetized. Then, subjects that undergo spinal cord transection receive a complete bilateral cut to their spinal cord between thoracic regions T8-T10. This type of surgery is the standard in animal models, as it completely disconnects the brain from the lower spinal cord, yet it preserves sections of the spinal cord necessary for hindlimb movement. A collagen matrix is then injected at the surgery site to prevent axonal regeneration. Subjects in the sham surgery condition undergo similar procedures but do not have their spinal cord cut. Following surgery, subjects receive pain medication and are returned to their home cage with the mother. Analysis is ongoing in the DWB vs open field study. Findings from the treadmill study highlight the importance of starting physical treatment early following a SCI and the type of recovery that is supported by the isolated spinal cord. Overall, use of this neonatal rat model of SCI highlights the behavioral potential of the developing spinal cord and hope for functional recovery.

Morgan Armstrong

Subject: Creative Works

Taste of ISU Creative Works

For this project, I created ice cream out of hair. I used a piece of styrofoam in the middle to build the shape, then cut a wig into strips and twisted the hair around the styrofoam to form the swirled ice cream look. After wrapping it, I fluffed the hair to give it more volume and texture. To finish it off, I glued a fake cherry on top and added colorful fake sprinkles for a realistic and fun final touch. This project required patience and creativity, especially when shaping the hair evenly to make it look like real soft-serve ice cream. I also had to carefully secure each section so the hair stayed in place and kept its structure. Overall, this process combined hairstyling techniques with sculpting skills to turn an everyday dessert into a unique and eye-catching hair design.

Jolie Baker

Subject: Creative Works

How Grape!

The food I created with hair is grapes. I originally tried to do it with only hair, but the synthetic wig proved to be difficult. This led me to using styrofoam spheres to make the shape. I spray painted the balls purple to match the wig and hot glued the hair to the ball. Then I hot glued the balls together in the shape I wanted to form the grapes. I then took a piece of a green wig and pinned it to one of the balls and hair-sprayed it to place the hair where I wanted. I finally sprayed everything down with multiple hair sprays and a shine spray.

Isi Barkdull

Subject: Creative Works

Fair of '07

When creating my submission, I immediately got an idea to create a hairstyle on a mannequin head based on one of my favorite childhood sweets; cotton candy. As a kid, I always remembered getting blue cotton candy from the Eastern Idaho State Fair (which was my absolute favorite). This project highlights both my love for Cosmetology, creativity, and takes me back to my roots when I was a little girl. To create this sweet, fair food inspired look I took a blue party wig, cut some fun side swept bangs, created two teased pigtails to create that fluffy cotton candy look, then added my finishing touches with blue spay-on hair dye, dry shampoo, two paper cones, as well as holographic plastic wrap to really give it that freshly-made cotton candy feel.

Brooklynn Beckstead

Subject: Creative Works

Taste of ISU

My food theme is a cupcake. I started by brushing the hair to smooth and calm it, then applied hair wax to create a sleek finish. Using a comb, I refined the surface even more for a polished look. I pulled the top half of the hair into a messy bun and secured a cupcake liner around it to resemble the base of a cupcake. The remaining hair was smoothed into a low side ponytail, and I wrapped a small section around the elastic to conceal it for a clean finish. Finally, I applied hairspray to ensure a strong, long-lasting hold.

Brylei Beorchia

Subject: Creative Works

Pineapple Updo

This hairstyle is a fun way for you to show off your sweet side. To make it, I used a mannequin, a synthetic wig, and lot and lots of hairspray.

Emma Birch

Subject: Creative Works

Sushi Playe

I drew inspo for my project from Japanese culture. Also my family loves sushi. I used paint hair and play dough to create my piece.

Abby Bowman, Katie Stubbers, Gabriela Perez, and Shannon Lynch

Subject: Health, Nutrition & Clinical Sciences

Prevalence and Co-Occurrence of PTSD, Depression, and Substance Use Disorders Among Women in Jail: Implications for Mental Health Assessment

Women in jail experience disproportionately high rates of depression, posttraumatic stress disorder (PTSD), substance use disorders (SUD), and serious mental illness (SMI) compared to incarcerated men and the general population (Kopak et al., 2024; Lynch et al., 2014). Many facilities rely on brief mental health screening tools (e.g., the Brief Jail Mental Health Screen; BJMHS) that may fail to identify clinically significant concerns, particularly among women and rural populations (Steadman et al., 2005; Kopak et al., 2024), and screening practices are often inconsistent due to resource constraints (DiRosa et al., 2025). This study uses publicly available mental health screening tools to examines prevalence and co-occurrence of probable PTSD, depression, alcohol use disorder (AUD), and SUD among women in two Southeastern Idaho jails. A random sample of 174 incarcerated women (ages 18–63) completed brief validated measures with established clinical cutoff to assess PTSD symptoms, depressive symptoms, alcohol use severity, and drug use severity. Procedures were approved by the ISU Human Subjects Committee; trained graduate-level interviewers obtained informed consent and administered measures individually in confidential jail rooms. Probable PTSD was identified in 53.8% of participants and probable depression in 66.1%. Probable AUD was present in 31.6% and probable SUD in 89.0% of participants. Co-occurrence was common: 44.8% met criteria for PTSD and depression, 45.4% for PTSD and SUD, 57.5% for depression and SUD, and 37.9% for PTSD, depression, and SUD concurrently. Women in these jails reported high mental health and substance-related needs with substantial comorbidity, consistent with prior multisite findings (Lynch et al., 2014). The results suggest implementing brief, disorder-specific validated screening tools may improve identification, referral, and continuity of care in resource-limited jail settings.

Kayci Breshears

Subject: Creative Works

A Sweet Surprise

This project is an artistic sculpture that turns hair into the form of a chocolate fountain. Hair is usually connected to beauty and personal style, while a chocolate fountain is something people associate with treats and enjoyment. Combining these two ideas was meant to catch attention and make viewers look twice. The piece was created using synthetic hair styled to look like flowing chocolate. Strawberries and marshmallows were added because they are commonly dipped in chocolate and help make the sculpture feel familiar at first. These materials were chosen to contrast something appealing with something unexpected. In conclusion, this artwork encourages viewers to think differently about beauty, materials, and first impressions by presenting hair in an unusual and surprising way.

Sophie Briscoe, Kim Gomez, and Zoe Lutz

Subject: Health, Nutrition & Clinical Sciences

How Technical Factors Shape Image Quality

Small changes in technique can have a significant impact on image quality and radiation exposure. While higher techniques can still be diagnostic, as technologists we are expected to follow the ALARA principle. Lower techniques save the patient dose and can be diagnostic, but image quality is less than ideal and smaller details could potentially be missed. The technique is determined by the patient size, image contrast and dynamic range requirements.

Kole Brown, Ethan Anthony, and Gavin Bissell

Subject: Engineering, Physical & Mathematical Sciences

Evaluation of DOE Type A Package Testing Using Liquid Surrogates for Regulatory Compliance

This study evaluates a conservative testing approach for the Department of Energy (DOE) Type A package qualification by comparing liquid and solid containment performance under regulatory testing conditions defined in 49 CFR 173.465 and 173.466. While these regulations establish standardized mechanical and environmental tests, they do not explicitly require worst-case material substitution during testing. In this project, liquid-filled vials were used as a surrogate for solid radioactive material to establish a bounding case for containment performance. Liquids present a more stringent test condition due to their ability to leak through minor containment failures, whereas solids require more significant structural compromise to disperse. With the recommendations from industry partners, TRG Inc, we tested the integrity of the package in order of: water spray test to simulate rain, free fall of 1.2 meters, penetration test by a metal bar, and finally a stacking test five times the weight of the package. Although there are differences in package requirements for liquid and solid radioactive materials, the goal was to test the protection of the vessel with the expectation that it would contain a solid when in non-experimental use. Experimental results demonstrated that if containment integrity is maintained for liquid samples under drop, impact, and handling conditions, then solid material containment can be reasonably assured. This approach reflects conservative engineering principles commonly used in nuclear safety design philosophies, with expected adverse package handling and degradation due to the environment. These comprehensive tests exclude accident conditions because of the low radiation safety concerns of the carried material. The findings support the use of liquid surrogates as a valid method for strengthening confidence in package performance beyond minimum regulatory requirements.

Prajita Budhathoki, Jared Cantrell, and Mustafa Mashal

Subject: Engineering, Physical & Mathematical Sciences

Hybrid Timber-UHPC Structures for High-Performance and Low-Carbon Construction

Buildings account for more than one-third of global carbon emissions, creating an urgent need for structural systems that reduce environmental impact without compromising performance. This research investigates the development of an innovative Timber–Ultra-High-Performance Concrete (UHPC) hybrid structural system in contrast to timber–Normal Concrete (NC) systems. While timber is renewable and exhibits low embodied carbon, its limited strength and stiffness restrict its use in high-demand structural applications. Normal concrete provides moderate compressive strength (3-5 ksi) and contributes significantly to carbon emissions. UHPC, by contrast, achieves compressive strengths of 12-30 ksi, allowing for thinner sections, improved durability, and reduced material volume. This study evaluates the structural performance and interfacial bonding behavior of layered timber–UHPC panels subjected to equivalent loading conditions. Through experimental testing and analytical evaluation, optimized interface strategies are developed to enhance composite action, flexural capacity, and spanning efficiency. The hybrid system's performance is directly compared with timber-NC panels to quantify improvements in strength and stiffness. An embodied carbon assessment is also conducted to evaluate potential environmental benefits. The goal of this research is to develop a scalable, high-performance hybrid structural system that expands the structural capabilities of timber while reducing overall material use and carbon footprint. By integrating renewable materials with advanced cementitious composites, this project demonstrates how innovative hybrid design can contribute to more sustainable and resilient construction practices.

Mosiah Bunting, Savanna Young, and James Mahar

Subject: Engineering, Physical & Mathematical Sciences

Use of Gravel, Sand, and Portland Cement to Stabilize Roadway Subgrades in Southeast Idaho

Southeast Idaho is covered by large areas of wind-blown silt (loess). The loess below Idaho roadways is very vulnerable to saturation collapse. Subgrade saturation is responsible for roadway damage, reduced pavement life, and increased transportation costs for the state. Since 2014, the Idaho State University Department of Civil Engineering has been studying ways to stabilize Idaho roadway subgrades built on loess. This most recent work involves laboratory tests in which gravel, sand and/or cement are used alone or blended and compacted with native loess to stabilize subgrades and increase the bearing strength of native soils below pavements. To date, mix designs have included 0, 10 and 25 precent gravel and 2 and 5 percent Portland cement by weight loess. Baseline tests were performed on compacted loess with no additives. Sand will be added in future work.

Preliminary results yield unsoaked California Bearing Ratio (CBR) values in the range of 35.2 and 136.2 for gravel-cement stabilized mixes. These values increased from 114.9 to 161.8 when the samples were soaked for 96 hours. The strength gain was in direct response to added hydration of the cement. Without cement and coarse aggregate, soaked CBR values in compacted native loess are 3.7 and 7.8. These values are totally inadequate for subgrade support below pave-ments as evidenced by the poor performance of many Idaho roads. Future CBR tests will be conducted to develop optimum mix designs. Clearly, addition of cement with and without aggregate in subgrades will greatly extend the useful life of Idaho pavements.

Grace Cain, Heather Ray, and Devaleena Pradhan

Subject: Biological & Natural Sciences

Synthesizing Probes and Refining a Protocol for In Situ Hybridization of Androgen Related Molecules in Bluebanded Gobies

Sex steroids are hormones critical for the development and maintenance of sexually dimorphic reproductive features and behavior. Androgens typically lead to the masculinization of specific phenotypes. Although this relationship has been established, the mechanisms that regulate androgen production and its effects are complex. Bluebanded gobies are a Teleost fish capable of bidirectional sex change, and therefore serve as an ideal organism to study sex-related molecules. Testosterone, a well-known androgen, can be converted to 11-ketotestosterone (11-KT) which plays the role as a potent androgen in teleost fish. This reaction occurs via a two-step process involving the enzyme 11β-hydroxysteroid dehydrogenase (11β-HSD), suggesting that this enzyme may be key in androgen regulation in bluebanded gobies. Additionally, testosterone and 11-KT can bind to androgen receptors (AR), which further activate downstream cellular changes. There may be key differences in the expression of these two molecules in both males and females that help establish and maintain sexually dimorphic features. Although these two molecules have been investigated at the functional protein and gross tissue gene expression level, the anatomical expression of 11β-HSD and AR mRNA has not been investigated in the brains or the gonads of bluebanded gobies. To provide insight into this, I have developed a tissue and species-specific protocol for in situ hybridization: a promising technique that aids in the visualization of the spatial distribution of mRNA expression in tissues. Therefore, for this project, I sectioned ovaries, testes, and brains from male and female bluebanded gobies. I then designed and synthesized RNA probes for both genes utilizing PCR, gene cloning, and in vitro transcription. Lastly, I optimized a novel protocol for in situ hybridization for the brains, ovaries, and testes in this species. This protocol provides the necessary molecular tools to lay the foundation for future investigations of the anatomical locations of other sex-related genes.

Amanda Coburn

Subject: Creative Works

When the Witch Becomes the Hunter: Illustrating Shared Characteristics of Contemporary United States Politics and the European Witch Hunts

My work is about how power grows, inverts, and breaks. I research the history, theory, and political consequences of how governmental and religious structures use power and how they are aesthetically resisted in turn. Through an interdisciplinary practice of bookmaking, printmaking, and drawing, my thesis project explores how power dynamics in contemporary United States politics look like the European witch hunts. In a dialectical exercise, I invert the witch hunt and create artworks to function as trials of current events. Emergent themes that Americans share with this historical period include seeking certainty during societal instability, the collaboration of state and religious influences, actions taken to justify the protection of the future, women and “othered” folks losing autonomy, and the search for and destruction of secret knowledge. Out of this research, I am beginning to work with the book as a physical manifestation of power dynamics. I am interested in the life of the book and how it may stand for subjects of rule. It is not only a symbol for attaining knowledge or upward class mobility, but for how a public engages with ideas, objects, and institutions broadly. Why is the book simultaneously worshipped and vilified, circulated and banned, archived and burned? A society’s relationship to the book reveals that society’s relationship to power. I am curious about what happens when we intentionally destabilize this relationship and how art plays a crucial role in this process. Structured like the undergraduate version of a graduate thesis project, I will present the full body of artworks and defend my research in Spring 2027 to earn my Honors Bachelor of Fine Arts degree in Art with minors in art history and history. I intend to build on this research not only as an artist, but as a writer, scholar, and educator. After graduation, I will pursue my Masters of Fine Arts degree then my Doctorate of Philosophy degree in Art Theory.

Kelsey Coles

Subject: Creative Works

Taste of ISU

For my food hair project, I chose a theater theme. One side of the hair is styled to look like buttery popcorn, while the other side resembles a blue ice slushie. To add extra detail, I incorporated some candy accents and applied vintage-inspired makeup with glitter for a glamorous touch. The hair is styled into two buns at the bottom, adorned with vintage polka dot ribbons and a matching choker, completing the classic theater look.

Amarissa Cramer, Parker Hazelbush, Tiana Hursh, and Chance B. Ronemus

Subject: Biological & Natural Sciences

No Allochthons allowed: Detrital zircon provenance contradicts Post-Triassic terrane accretion in Central Chile (32-34 S)

The western margin of South America represents a long-lived convergent plate boundary shaped by crustal growth, recycling, and terrane accretion since the Paleozoic. However, whether Mesozoic terrane accretion significantly contributed to crust assembly in Central Chile (32-34°S) remains debated. This study directly tests two competing models: A) an east-facing intra-oceanic island arc sutured onto the continent during the Mesozoic, and B) sustained east-dipping subduction and long-lived continental-margin magmatism since the Carboniferous. Ten sandstone and one tuff samples were collected from the Coastal Cordillera and the Principal Cordillera, straddling the proposed suture. Approximately 2700 zircon grains were analyzed using U-Pb geochronology. Age probability distributions were compared with established regional magmatic provinces and published datasets. All sandstone samples, west and east of the proposed suture, yield broadly similar, multimodal age spectra. Dominant age populations are consistent with Carboniferous arc magmatism (~300-330 Ma), Ordovician Famatinian/Pampean (~450-480 Ma), Mesoproterozoic Sunsas/Grenville basement rocks (~1.0-1.1 Ga), with subordinate Jurassic and Archean ages. No anomalous age populations are indicative of exotic arc terranes. All major populations are present in the Chilean Paleozoic accretionary complex, suggesting recycling from uplifted forearc topography. Zircon from the Argentinian Choiyoi magmatic province (~240–280 Ma) are sparse, suggesting the paleo-continental divide was near its present position. Our results suggest generally stable sediment routing across ~120 Myr of marginal evolution. The shared detrital zircon age spectra across structural domains indicate shared Gondwanan sediment sources and contradict models invoking isolated pre-collisional basins west of a Mesozoic suture. These findings constrain models of Andean crustal assembly and suggest that Central Chile represents a long-lived west-facing continental margin, rather than a site of major Mesozoic terrane accretion. This study refines tectonic reconstructions of the southeastern Pacific margin and contributes new provenance data to an under-characterized latitudinal corridor.

Brooklynn Crockett

Subject: Creative Works

Taste of ISU by Brooklynn Crockett

For this project, I was assigned to create something out of hair that represents food. I decided to make a cornucopia because I thought it would be a creative, yet unexpected way to display multiple different types of food. The materials I used for this project included a mannequin head, several wigs for braiding, foam pieces, artificial fruit, and decorative fillers such as leaves and wheat. I started by braiding multiple small braids and wrapping them around the foam pieces. The foam was used for structure in order to hold the cornucopia up itself. For the braids, I used two different methods to create a more “weaved” look. I used a simple three-strand method and a two-strand twist method to achieve this. Once the hair was braided into the shape of the cornucopia, I started adding the fruit. For the fruit, I decided to use grapes, apples, lemons, and a peach. I used sticks and foam to make the appearance of the fruit coming out of the cornucopia and to hold them in place. I then used different colored leaves and wheat around the base to add a more traditional element. While making this project, I had to restart several times because creating a structure that was able to hold itself up was very difficult. After several attempts, I finally was satisfied with my end result. In the end, I successfully completed the cornucopia made from braided hair and filled with fruit. This project also helped me learn how to problem solve and how to adjust my work when something does not go as planned, and I will be able to use these skills in the future as a cosmetologist.

Jaden Davis

Subject: Humanities, Behavioral & Social Sciences

Emotional Regulation Skills as a Mediator Between Sleep Quality and Somatic Symptoms

Sleep disturbances (i.e., poor sleep quality, trouble falling/staying asleep, sleep-related daytime impairment) have been shown to be comorbid with physiological manifestations of psychological disturbance, referred to as somatic symptoms and often include dizziness, nausea, and indigestion. The probability of internalizing or somatoform conditions also increases with poor sleep quality. Emotion regulation skills are highly utilized as strategies to mitigate the effects of internalizing and somatoform conditions. However, some research has found that there are limited studies looking into the influence of emotion regulation skills on sleep quality and its interaction with somatic symptoms. It has been found that adaptive emotional regulation skills play a role in decreasing sleep disturbances. As such, the present study aims to better understand sleep disturbances, emotional regulation skills, and psychosomatic symptoms due to the dearth of current research. We hypothesize that adaptive emotion regulation skills will predict fewer sleep disturbances (i.e., better sleep quality, improved consolidation of sleep, fewer daytime impairments) and lower somatic concerns; conversely, maladaptive emotion regulation skills will predict increased sleep disturbances and somatic concerns. Further, we hypothesize that emotion regulation skills will act as a moderator between the interaction of sleep disturbances and somatic symptoms. Participants will be recruited through the SONA program at Idaho State University and compensated with course credit for completing a selection of measures. The measures to be used are the Insomnia Severity Index (ISI) and Pittsburgh Sleep Quality Inventory (PSQI) to measure insomnia-related symptom severity and general sleep variables (i.e., subjective quality, latency, duration, efficiency, disturbances, medication use, and daytime dysfunction), the Brief Coping Orientation Problems Experienced (Brief COPE) to measure emotion regulation skills, and the Psychosomatic Symptoms Questionnaire-39 (PSQ-39) and Somatization items in the Symptom Checklist-90 (SC-90 SOM) to assess for somatic Symptoms. Results are forthcoming.

Uddhav Dev and Jared Cantrell

Subject: Engineering, Physical & Mathematical Sciences

Experimental Investigation of Mechanical Properties of Concrete with Upcycled Fine and Coarse Aggregate

Millions of tons of concrete waste are discarded into landfills each year. Rather than allowing this waste to accumulate, it can be reused in concrete mixes that deliver comparable performance to virgin materials. This study investigates the mechanical performance of concrete specimens incorporating Upcycled Fine Aggregate (UFA) and Upcycled Coarse Aggregate (UCA) as substitutes for virgin aggregates. The mix design was developed using a control mix per cubic foot, with Portland cement (Type-IL) kept constant across all mixes, while UFA and UCA were introduced simultaneously at replacement levels of 0%, 12.5%, 25%, 37.5%, 50%, 75%, and 100% by weight. Standard 4×8-inch cylindrical specimens were cast and tested after 28 and 56 days of curing to evaluate compressive strength at each replacement level. The results indicate that upcycled aggregates can be effectively utilized in concrete production without significant compromise in compressive strength, particularly at lower replacement levels. Substitution levels of 12.5% to 25% UFA and UCA yielded the highest compressive strength values, reaching approximately 7,111 psi. However, increasing replacement ratios beyond 50% resulted in a gradual reduction in compressive strength, with the 100% replacement mix producing approximately 5,858 psi. These findings were further compared against existing literature, supporting the conclusion that partial replacement of natural aggregates with upcycled materials is a structurally viable and environmentally sustainable approach to concrete production, reducing dependence on virgin materials and minimizing construction waste.

Kya Downing

Subject: Creative Works

Cherry Ice Cream

The hair features a smooth, blunt white bob to represent the ice cream base. Red accent buns were added to represent cherries, creating contrast and making the design stand out. A green stem accessory was added to connect the cherry theme, and sprinkle details were placed on top to represent ice cream toppings. The overall look is clean, colorful, and dessert-inspired.

Levi Farber

Subject: Engineering, Physical & Mathematical Sciences

Experimental Identification of Dynamic Battery Impedance for Predicting Embedded System Voltage Droop

Battery-powered embedded systems are commonly analyzed using a simplified internal resistance model; however, under dynamic loading conditions, this assumption often fails to predict real voltage droop behavior. This project develops and experimentally validates a practical method for extracting a multi-parameter internal impedance model that predicts transient voltage stability across common battery chemistries. NiMH, alkaline, and lithium cells were characterized using a custom MOSFET-based pulse-load circuit constructed on a protoboard and instrumented with high-speed time-domain measurements. Sub-millisecond current steps were applied to capture both the immediate ohmic response and slower transient recovery effects. From these measurements, parameters for a multi-time-constant equivalent circuit model were derived directly from the voltage waveform. The extracted models were implemented in circuit simulation and validated against independent dynamic load profiles representative of embedded operation. Results show that incorporating multiple time constants significantly improves the prediction of transient voltage droop compared to single-resistance approximations. This work demonstrates an accessible and industry-relevant approach to improving battery modeling for embedded power integrity analysis.

Jaime Fong

Subject: Biological & Natural Sciences

Microbial Specialization in Male Pregnancy

A major objective of microbial ecology is to understand the processes that drive variation in microbial communities, including variation in host-associated “microbiomes.” My research addresses the potential for different microbiomes in different regions within a host (pipefish) body, and whether certain body sites, such as those with stronger ties to reproduction and the immune system, show stronger influence on microbiome composition. By using 16S rRNA gene sequencing, we can quantify bacterial members of the community and investigate whether males of the Syngnathidae fish family evolved specialized microbiomes associated with their novel trait of brood pouches. Our study includes samples from two species of pipefish (genus Corythoichthys), collected from Guam. We’re characterizing the microbiomes from the gill, external brood pouch, internal brood pouch, and gastrointestinal (GI) tract. During my project I’ve purified DNA from the samples, and tested a subset of the samples for bacterial DNA using polymerase chain reaction (PCR) screening. Through this process I’ve learned to perform column-based DNA isolation techniques, and optimization of PCR amplification of bacterial 16S rRNA gene fragments. Additional laboratory skills have included agarose gel electrophoresis with standard fragment ladders, to interpret band patterns and confirm successful amplification. I’ve also learned general laboratory skills, including maintaining clean and uncontaminated working conditions, reagent calculations and measurements, recording results, and procedures in a laboratory notebook. I’ve confirmed the presence of bacterial DNA in samples from different pipefish tissues, a necessary step towards eventual amplification of high-throughput sequencing libraries. Future steps of my project include assessing DNA concentration, amplifying the libraries for concatenated, long-read sequencing, and performing microbial community analysis. With my analyses I’ll aim to answer whether host body sites with significance to reproduction and fitness exhibit strong filtering of microbial communities, and how effective novel, versus conserved, host traits are at recruiting and maintaining microbial communities.

Kazlyn Freestone

Subject: Creative Works

Cotton Candy

I created my “Cotton Candy Space Buns” using a bright neon pink wig paired with cotton candy paper cones. After cutting and shaping the wig, I repurposed the excess hair to form two textured, messy buns, which I securely pinned onto the mannequin head. To attach the cones, I hot-glued hair pins inside each one, allowing them to fasten firmly over the buns while maintaining stability and structure.

Miriam Fridel, and Brandon Peecook

Subject: Biological & Natural Sciences

Investigating the Presence of the Ice Age horse Haringtonhippus in the American Falls Collection of the Idaho Museum of Natural History

Horses first evolved in North America. During the Pleistocene (2.58 MA) there were two types of horses in North America: stout legged and stilt legged. While originally believed to be in the same genus (Equus), ancient DNA tests found that stilt legged horses were their own genus (Haringtonhippus) (Heitzman et al., 2017). Since its discovery in 2017, Haringtonhippus has been found across western North America. Currently, Haringtonhippus has not been recognized in Idaho, despite the abundance of Idaho horse fossils. However, due to its history of being synonymized with Equus, it is likely that Haringtonhippus fossils do exist in museum collections. This project reevaluates the American Falls collection of the Idaho Museum of Natural History (IMNH) to investigate if Haringtonhippus was present in Idaho during the Pleistocene. Data collection is split into two phases. In phase 1, all equid metapodials in the IMNH American Falls collection were measured (n=194). The data will be plotted in a PCA graph to determine if there are two discernible groups of horses in the collection. In phase 2, all equid cheek teeth in the IMNH American Falls collection will be given digital landmarks (Grass et al., 2023; Landry et al., 2026). These landmarks will be analyzed through a variety of software and the results will be plotted in PCA and CVA graphs. Investigating the presence of Haringtonhippus in Idaho will add to the knowledge of the population distributions of megafauna during the Pleistocene of North America. Understanding the distribution Haringtonhippus allows for more studies on interspecies competition and resource partitioning (Jiménez-Hidalgo et al., 2019, Spencer and Scott, 2023), as well as an increased understanding of the movement of megafauna across the continent (Mitchell et al., 2023).

Marissa Gallup

Subject: Creative Works

Cherry Cola Styled Hair

The central focus is a mannequin head named "Gabriela" featuring deep cherry-red hair. The style is divided into two distinct sections: a soft, wavy shoulder-length base and an elaborate, vertical structure that mimics a Cherry Coca-Cola bottle. The vertical "bottle" element is a masterclass in structural hair design. Form & Structure: The hair is pulled upward into a tall, cylindrical column, cinched in the middle to replicate the iconic silhouette of a soda bottle. Braided Accents: Thin, tight braids run vertically along the "bottle" section, adding texture and reinforcing the shape. Branding: An actual Cherry Coke label is wrapped around the center of the hair column, perfectly color-matched to the hair's mahogany hue. The "Cap": The look is topped with a red plastic bottle cap, with a tuft of hair sprouting from it to simulate a "fizzy" or "overflowing" effect.

Aramy Glaser

Subject: Creative Works

Campfire Roast

My project is called Campfire Roast which is a part of the Taste of ISU. My food is based on roasting marshmallows at a campfire. I made the fire base using cotton stuffing and a grocery bag then layered on yellow, orange, and red synthetic hair to complete to fire piece. I made a wooden log out of a plastic water bottle base with different shades of brown mannequin hair and brown paper for the log spiral. I used the same different shades of brown mannequin hair to create the sticks for the marshmallow with the base being popsicle sticks. I used cylindrical styrofoam to make the marshmallows and the brown paper to create the look of a dirt pile holding up the marshmallows on the sticks. Finally I added green synthetic hair to replicate the look of grass. All of these were achieved but the use of lots and lots of hot glue.

Rachel Grider, Nate Kopp, Adalberto Alcarez Marquez, Braden Clark, Nicole Huang, Olivia House, Mady Za, Lizbeth de la Cruz, and James Groome

Subject: Biological & Natural Sciences

“Neurobiology Across the Lifespan" student research of age-related disorders of excitability

We have developed a Vertically Integrated Projects course-based undergraduate research experience for ISU undergraduate students interested in neuroscience. This collaborative course engages students in the study of ion channels in signaling and their role in age-related syndromes including diabetes and infantile epilepsy syndromes. Projects include

immunocytochemical and confocal microscopy to study ion channel targets of dysfunction pancreas and sympathetic ganglia, and electrophysiological and mathematical modeling of sodium channels as targets of dysfunction in developmental epilepsy syndromes. Undergraduates are mentored by the PIs and graduate students of the de la Cruz and Groome laboratories in the Department of Biological Sciences. We are currently completing our second semester of course development, with a total of 15 undergraduate students and 2 graduate students participating.

Soha Haniyyah and Jordyn Steers

Subject: Biological & Natural Sciences

Baseline Gating Properties of Wild-Type hNaV1.2 Voltage-Gated Sodium Channels

Voltage-gated sodium channels are essential for the initiation of action potentials in neurons. The human brain sodium channel hNaV1.2 is strongly implicated in neurological disorders including epilepsy. However, detailed characterization of its baseline gating behavior remains important for interpreting disease-associated variants. To investigate this, wild-type hNaV1.2 channels were expressed in Xenopus oocytes by injection of messenger RNA. Channel activity was recorded using cut open oocyte voltage clamp (COVC) electrophysiology. Voltage-clamp protocols were applied to characterize channel properties and establish normal (wild type) hNaV1.2 gating behavior. Data analysis software was then employed to assess the kinetics and probability of activation, inactivation from both closed and open states, as well as the recovery from inactivation. These findings show that wild-type hNaV1.2 channels exhibit rapid, voltage-dependent activation and inactivation from both the closed and open states. In addition, approximately 75% of the hNaV1.2 channels recovered from the inactivated state in 50 ms, indicating relatively rapid recovery kinetics under these recording conditions. In the future these baseline measurements will be compared to mutations in the hNaV1.2 voltage-gated sodium channel associated with developmental epilepsy. By defining normal channel behavior, this work contributes to a clearer understanding of mechanisms underlying altered neuronal excitability in epilepsy syndromes.

Kacie Hansen

Subject: Creative Works

Strawberry

The food that I used as my inspiration was a strawberry. I got a bright green wig and painted it with dark green acrylic paint, then I blow dried, brushed, and curled it. For the strawberry I used a big piece of foam and cut it into a strawberry shape. I then painted it red and used red yarn, braided it and glued it onto the strawberry. For the leaves and seeds I used felt. I then tied the hair into two pigtails with ribbon. I used acrylic paint to do her makeup.

Paige Hansen

Subject: Creative Works

Breakfast Nails

This nail set presents a food-inspired interpretation of nails, transforming miniature culinary elements into detailed wearable art. The designs feature hand-sculpted and hand-painted foods, including a blueberry waffle design, a mango-inspired gradient nail, coffee bean accents, a dimensional avocado toast design, and a cinnamon roll pastry finish. Each nail incorporates realistic textures, layered color blending, and 3D embellishments to create the final product of breakfast nails!

Isabel Harbig

Subject: Creative Works

Layered Faith

The grandeur of cathedrals across the world has drawn the attention of curious onlookers for centuries. While taking a semester to study abroad, these memories of awe-inspiring works have remained my most prized souvenirs. Drawing inspiration from the many holy monuments scattered across Western Europe, I crafted this pierced piece of copper and bronze as an ode to the craftsmanship that has bridged ancient and modern perceptions of worship. The sheer scale of these cathedrals alone is a show to the power they hold. The intricate detailing has slowly started to push me to question permanence, craftsmanship, and faith. The many piercings in this piece help to represent the meticulous, repetitive labor that serves as the foundation for the construction of these cathedrals. The delicate copper structure that sits under its arched support is reminiscent of stained glass windows that brilliantly played with daylight shining through. As I continue to practice metalworking, I hope to one day refine my talents to even better depict the amazement one feels gazing at these wonders.

Isabel Harbig and Andy Silva

Subject: Humanities, Behavioral & Social Sciences

Behavioral and neural consequences of non-invasive brain stimulation for improving vision

Visual crowding occurs when many similar objects appear in our peripheral vision, leading to confusion and a lack of detail in that area. Consequently, critical abilities such as reading and facial recognition are reduced when using peripheral vision. This study tests whether it is possible to improve peripheral reading using a combination of focused training and non-invasive high-definition transcranial electrical stimulation (HD-tES), a safe method that can enhance neuroplasticity in the brain with minimal side effects. This is particularly vital for individuals who suffer from progressive eye diseases such as age-related macular degeneration (AMD) and therefore exhibit permanent loss of central vision. Half of our participants will be given true HD-tES and half will be given placebo tES while reading text using peripheral vision over multiple days. We will examine whether true HD-tES improves reading ability beyond placebo. Furthermore, we will use time-domain near-infrared spectroscopy (TD-fNIRS), a wearable functional neuroimaging technology, to investigate any changes in brain activity that occur over time within the visual pathways due to the reading practice and brain stimulation. People with normal vision will be tested, and peripheral fixation will be monitored with an eye tracker. Our hypothesis is that peripheral reading ability will improve after true HD-tES compared to placebo HD-tES. We also hypothesize that this will be accompanied by greater neuroplastic changes in the brain's visual processing over time in participants receiving true HD-tES, as measured by the TD-fNIRS system. This experiment will increase our basic understanding of neuroplasticity in peripheral vision. Furthermore, there is currently no restorative cure for eye damage resulting from macular disease. Therefore, developing new methods to effectively use healthy peripheral vision would be transformative for patient quality of life.

Emry Harward

Subject: Creative Works

Charcuterie Chic

Charcuterie boards, like nails, are fluid works of art that can incorporate or exclude many elements! With this set, I ultilized length and 3D texture to create grapes, a can of sardines, a cheese wheel, skewered olives, crackers, and a jam spread. I enjoyed watching this piece come together, especially after tweaking my intial mock-up. Charcuterie Chic is an acrylic set of nails painted using gel polish.

Jeremy Hernandez

Subject: Biological & Natural Sciences

Comparison of Group I & II Elements in Shoreline Waters and Oil-Rich Environments of the Great Salt Lake

The northern arm of the Great Salt Lake (GSL) in Utah is a notable hypersaline environment that contains around 25-30% dissolved salts of Group 1 and 2 ions, and relatively high concentrations of the transition metals. Despite this extreme hypersaline environment, the lake is populated by the three domains of life, but most notably the Archaeon family, Halobacterium. To better understand how these microorganisms thrive in this environment, we are analyzing water samples from the shallow shoreline waters of the lake and oil-rich samples taken from 2023, 2024, and 2025. However, analyses of these water samples are difficult because sodium ions easily overwhelm the current technology. The sodium content of the northern arm of the GSL is typically around 25-27% compared to ocean water at 3%. To improve our analysis, we performed dilutions on the samples and have analyzed them with Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES). The data collected from these results, along with their statistical analysis, will enable us to identify any differences between these two environments. Our results will help us understand the role the metal-rich environment has on the microbial community, and how these microbes adapt to these conditions.

Tiana Hernandez

Subject: Creative Works

Taste of ISU

This mixed-media piece uses a mannequin head, a red wig, brown puff balls, and yellow yarn to reimagine spaghetti and meatballs. The hair becomes pasta, the puff balls transform into meatballs, and the yarn adds texture and density. By combining food imagery with the human form, the work plays with ideas of consumption, identity, and artificial beauty. The familiar comfort of a meal is contrasted with the artificiality of a mannequin, creating a humorous yet slightly unsettling visual experience.

Tiana Hursh, Parker Hazelbush, Amarissa Cramer, and Chance Ronemus

Subject: Biological & Natural Sciences

Basin development along the proto-Andean margin: Field observations from Triassic–Jurassic deposits in coastal Chile (~32°S)

Mesozoic sedimentary rocks in coastal Chile record evolution along the proto-Andean margin of South America. These rocks lack detailed sedimentological descriptions, limiting understanding of ancient depositional environments and basin development. To address this gap, we measured ~1.8 km of stratigraphic section from three formations at ~32 °S: the Middle(?)–Upper Triassic Los Vilos Formation (747 m), the Upper Triassic Pichidangui Formation (31 m measured; > 2 km total), and the Upper Triassic–Lower Jurassic Los Molles Formation (> 1081 m). Sections were described using lithofacies codes, and clast compositions and paleocurrent indicators were recorded. The Los Vilos Formation was deposited in angular unconformity atop folded Permian(?) metasedimentary basement. It consists of a basal breccia composed of recycled basement clasts that grades upward into trough cross-stratified fluvial sandstones. Overlying interbedded sandstone and mudstone—interpreted as low-density turbidites—mark basin deepening, followed by hummocky cross-stratified shallow-marine deposits. The overlying Pichidangui Formation is dominated by bimodal volcanogenic rocks with sparse sedimentary interbeds containing plant material, recording deltaic deposition during active volcanism. The Los Molles Formation transitions upward from shallow-marine sandstones into shelf and deep-marine deposits, including high- and low-density turbidites, debris flows, and mass-transport deposits. Vertical facies stacking documents repeated shifts between sand- and mud-rich intervals, indicating fluctuating sediment supply and accommodation. Together, these successions record repeated, rapid transitions from subaerial through deep-water deposition that are out-of-sync with global changes in sea level, suggesting fault-controlled basin subsidence. Our results provide stratigraphic context for ongoing detrital zircon provenance studies aimed at testing competing tectonic models for the evolution of coastal Chile.

Itallie Jensen, Elias Ybarra, Dameon Roskelley, Casey Evans, Jeremiah Maisch, Angel Fernandez, Daxton Hollum, Ixchel Fonseca, Ashraya Burklakoti, Mara Clement, and Emilio Gil

Subject: Biological & Natural Sciences

Serving Up Science with a Sizzle: The Discovery and Genome Annotation of Bacteriophage Steakfry

Steakfry is a novel bacteriophage isolated from a soil sample collected in a potato field in Pingree, ID, USA. Isolation was performed using the actinobacterial host Microbacterium foliorum NRRL B-24224. After multiple rounds of purification to isolate the bacteriophage, it was amplified until sufficient volumes were available for transmission electron microscopy, and this also allowed us to extract DNA for sequencing by the Pittsburgh Bacteriophage Institute. Based on its genomic characteristics and gene content similarity, Steakfry was assigned to subcluster ED2. The genome was annotated using the PECAAN (Phage Evidence Collection And Annotation Network) platform to integrate multiple bioinformatics lines of evidence. Structural annotation for Steakfry was conducted by identifying protein-coding genes using Glimmer and GeneMark. To ensure the highest accuracy, gene start sites were refined through Starterator and careful ribosomal binding site (RBS) analysis, ensuring a 'well-done' set of gene models. Functional assignments were derived from protein-level comparisons using HHPRED and NCBI BLASTP. Our results showed that, while finding this phage and preparing it for DNA sequencing, SteakFry is a unique bacteriophage due to its distinct gene sequence. In addition, while annotating the gene sequence, we have discovered that SteakFry has approximately 118 genes. Some of the fascinating genes that we found pertain to how the bacteriophage infects its host. For example, the tail needle protein allows the phage to inject its host. SteakFry also has a ribosomal protein, which is used to substitute a protein within the bacteria's ribosomes that it infects. We plan to use AI-powered AlphaFold to identify the many minor tail proteins.

Kyla Johnston

Subject: Biological & Natural Sciences

Salt-Binding Proteins from Halobacterium salinarum Strain NRC-1: A Study of Archaeal Protein-Salt Binding Capabilities and Isolation Techniques

The Great Salt Lake is host to all three domains of life in its environment despite the high concentration of salts present. This, along with the visible pink color, indicates the presence of Halobacterum, an archaeal organism family that thrives in a high salt environment and appears pink due to a high concentration of carotenoids produced by the cell. One mechanism this

organism uses for survival in such a harsh environment is the ability to form salt crystals. Currently, the mechanisms that lead to the formation of these crystals is unknown. One potential pathway is a protein present in these cells that has the ability to bind to salt. The aim of this project is to isolate and potentially characterize the protein(s) involved in this salt-binding process. Consequently, the first part of this project was to design a technique that would isolate proteins that bind to salt. The next steps are to begin the process of characterizing proteins that were isolated from the salt-binding technique. Through these processes, a clear characterization of a protein that specifically has the ability to bind to the crystalline lattice of sodium chloride, the principle salt in the Great Salt Lake, will arise. Achieving a firm understanding of the specific capabilities of this protein opens several potential real-world applications. From this work, future applications could include protein-based desalination as well as environmental and industrial cleanup of salty processes allowing in greener industrial processes with an environmental source.

Himanshu Jha, Farjana Eishita, Rifat Ara Tasnim, and Aney Paul

Subject: Engineering, Physical & Mathematical Sciences

Bridging Security and Usability in Handheld and Computer Devices

Handheld devices have become a key component of people's everyday tasks due to their rapid growth and ability to o!er seamless connectivity, on-the-go access, and personalized user experiences. However, with this convenience also come significant security threats, which are not limited to handheld devices alone. Building a secure and robust system requires strong encryption, but such mechanisms are often not user-friendly or intuitive. The primary focus of this project is to assess user literacy and expectations, and to propose potential guidelines that bridge the gap between security and usability when it comes to handheld of computer usage.

Tek Jones, Colten Moser, and Chad Isaacson

Subject: Engineering, Physical & Mathematical Sciences

Analysis of DOE Package Testing Certification Experiment

This project reviews the testing and certification process for a Type A package defined by the Department of Transportation (DOT) and Department of Energy (DOE) under transport conditions according to 49 CFR 173.465. The goal was to understand what tests are required, how they are performed, and whether they are sufficient enough to certify a package for transport. There are four standard tests in our test plan for type A packages (water spray, free drop, stacking, and penetration).These tests were designed and were conducted in accordance with the requirements of 49 CFR 173.465 for normal conditions of transport. The water test evaluates resistance to water, the free drop test assesses the packages ability to withstand impacts, the stacking test simulates compressive loads during storage and transport, and the penetration test shows the packages resistance to punctures from concentrated loads. After each test and at the end of all the tests the inside package was inspected for loss of contents and containment breaches. Our analysis examined whether the tests meet the minimum requirements specified by DOE's requirements or if there needs to be more testing to certify the package. This project shows the importance of meeting certification requirements of the DOT and DOE and whether the package is suitable for transportation. Overall this project shows that the package certification is focused on protecting the workers, the public, and the environment by proving that containment will be maintained through transportation.

Saydi Whyman, and Sydney Kelley

Subject: Health, Nutrition & Clinical Sciences

Effect of Shielding on scatter radiation

The goal of this experiment is to determine if introducing shielding materials affects the amount of scatter radiation produced. With the lack of shielding that occurs in daily practice, it is important to remember that scatter radiation is the main source of dose to technologists. When appropriate shielding for the patient is used, technologists receive an inconsequential amount of scatter radiation from the patient. While shielding the patient significantly reduces the amount of scatter radiation that reaches the technologist, it is important to remember that radiation safety needs to be practiced by technologists as well.

Lyndsey Kennel, and Sadie Wach

Subject: Health, Nutrition & Clinical Sciences

Making Cents of Collimation

Accurate collimation is a key component of radiographic imaging. The light must match the x-ray field to aid in reducing patient dose, preventing clipped anatomy, and repeating images. Incongruence between the collimator light and x-ray field can occur from light or mirror misalignment, the collimator blades drift mechanically, or the field-size indicator becomes inaccurate due to overuse.1-3 During clinical use, repeated anatomy clipping was noted at two different imaging sites using the table bucky for examinations with a 40-inch SID. The Light-Field Congruency Test was preformed to determine whether collimator calibration resulted in misalignment of the light and x-ray fields. By comparing the test results of the two x-ray units, technologists operating both machines can modify exams and prevent repeats.

Brooklyn Kimball

Subject: Creative Works

Ramen Cup

My Project is inspired by one of my favorite comfort foods - Spicy Ramen! I wanted to bring the same bold, fiery energy to my mannequin. The bright red hair represents the hot and spicy broth, while the curls give the look a fun, noddle-like texture. To top it off (literally), I created a tiny ramen bowl using a drink carrier holder and decorated it with homemade toppings like a cotton pad eggs, cotton seaweed, toe separator chives and nail pusher stick as chopsticks. It adds a playful touch that ties the whole them together. This look was all about mixing creativity and skills- using a curling iron, hairspray, and pins to shape the noodles and build hight to the bowl. Its spicy, stylish, and a little bit silly- Just like the perfect bowl of ramen.

Andrew Lawyer, Jordan Williams, Mackenzie Gorham, Mauricio Garcias, and Timothy Kampworth

Subject: Health, Nutrition & Clinical Sciences

Nuclear Materials Packaging and Transportation

For our presentation we decided to do tests on a Type A nuclear materials package. Type A packages can contain a multitude of things but can contain radiopharmaceuticals such as diagnostic isotopes and research radionuclides. These materials have limited radiological hazards if released, but it is still necessary that the packaging ensures the contents are not released. The objective of this project was to determine whether our packaging would hold up to the parameters set by the Department of Transportation. Our packaging included one Pelican radiological shipping container with insulating foam. The radioactive ‘pigs’ inside were enveloped by polyethylene foam and a PVC shell with rubber caps on both ends of the capsules. The testing parameters included a water spray test, where the package is sprayed to simulate 2 inches or rain per hour for one hour. The package was then dropped from 4 feet to simulate fall from a truck. The next test was the penetration test, where the box was struck with a piece of rebar. The final test consisted of a 24-hour period where the case was kept under a load 5 times the weight of the case. The findings of the experiments dictated whether the box would be considered a safe mode of transportation for Type A nuclear materials. (Findings incomplete thus far)

Justin Lupo, Sophia Sanchez, and Alyssa Vollmer

Subject: Humanities, Behavioral & Social Sciences

Satisfaction with Life and Creativity

A challenging question arises with regards to the relationship between creativity and how an individual rates their subjective well-being. Numerous research studies have examined the relationships among creativity, positive affect, and overall life satisfaction. The topic of ongoing debate is whether higher levels of creativity are associated with higher levels of positive emotion and subjective well-being. The goal in the presenting study was to see if this question could be addressed in a college setting, with first and second-year students. Our aim was to show that creativity is positively correlated with positive emotions and well-being. We found that our study's findings did provide evidence to support this claim. The results indicated positive correlations in each of the domains examined.

Sara Mackenzie, and Kristin Lane

Subject: Biological & Natural Sciences

Nuclear Localization of a Far-Red Fluorophore in Plasmodium falciparum

While malaria has been and remains to be one of the most pervasive infectious diseases on the planet, the biology of its deadliest causative agent in humans, Plasmodium falciparum, is not well understood. This is due in part to the difficult nature of studying P. falciparum's invasion into and development in individual human red blood cells. To help solve this problem, I built a plasmid which codes for a far-red fluorophore (TagRFP657) that will localize to the nucleus of P. falciparum. After transfecting the plasmid into parasite, we confirmed trafficking of the fluorophore to the nucleus through colocalization of its signal with SYBR green, a DNA intercalator, using confocal microscopy. A plasmid without the nuclear localization signal is currently being transfected into parasite to serve as a control for colocalization. When viewing individual parasites under the microscope, the amount of nuclear fluorescence will enable us to determine what life cycle stage the parasite is in. This will be helpful in correlating aspects of the infected red blood cell with the efficiency of invasion and growth of the parasite. Ultimately, this research will be instrumental in developing manufactured red blood cells with lowered susceptibility to invasion by P. falciparum to be used in blood transfusions for individuals in malaria endemic countries.

Cy Marchant, Xavier A. Jenkins, and Brandon R. Peecook

Subject: Biological & Natural Sciences

Night and day: Illuminating the scleral ring anatomy and diel activity patterns of stem reptiles

Diel activity patterns, when animals are active during the day or night, are a critical aspect of reptile ecology and behavior. However, the ancestral condition of the common ancestor of today's reptiles is not understood, and empirical data are unavailable for extinct species. Nonetheless, correlations exist between the scleral ring—a ring of overlapping bony plates within the eyeball—and diel activity in living animals: nocturnal species tend to have narrower rings with larger apertures, while diurnal species generally have broader rings with smaller apertures. Using this relationship, the scleral morphology of fossil reptiles can be used to reconstruct their diel activity by comparison with the anatomy and behavior of living reptiles, such as lizards and birds. To investigate the diel activity patterns in early reptiles outside the modern groups, we used µCT scans to identify and reconstruct the scleral rings of three species from the late Permian (~255 Ma) of South Africa: Milleropsis pricei, Youngina capensis, and Scyllacerta creanae. All three have minimally distorted, nearly complete scleral rings visible in the scans, representing the first reported instances in stem reptiles and allowing direct measurements of orbital geometry. Using linear discriminant analysis (LDA), we assessed the placement of these extinct species within a previously published dataset of living birds and lizards. All three fossil species exhibit a scleral ring morphology most consistent with diurnal lizards (active during the day) and plot near these taxa in the LDA. Although it is premature to draw evolutionary conclusions about the ancestral activity pattern of crown reptiles, our results suggest that Permian stem reptiles likely exhibited both diurnal and nocturnal diel patterns, a trend also reported for contemporary mammal relatives.

Artemis McEwen

Subject: Creative Works

Strawberry Ice Cream Dreams

"Belting out sunlight, shimmering love
Well, baby, I surrender to the strawberry ice cream
Never ever end of all this love
Well, I didn't mean to do it
But there's no escaping your love"
Come on if you don't know, "Accidentally in Love" by Counting Crows you are missing out.
I don't know about you but strawberry ice cream is my favorite flavor of ice cream. It reminds me of summer and the exhilaration that comes with it. The scoops are like the rolling hills. Full of color and life. The taste of strawberries is like sunshine, so refreshing. That's what I based my mannequin on. The prompt was to make it look like food was growing out of their head. I used the hair of the mannequin as a waffle bowl. A red wig as the strawberry ice cream. The only thing holding it together is hot glue and dreams. As for the makeup, I used acrylic paints. The sprinkles are actual face glitter that are supposed to glow in the dark.What I ended up with is a girl sweeter than cherries. She turned out better than I expected and was pretty fun to work on. Like a strawberry field of dreams.

Rori Mecham

Subject: Creative Works

Candy Nails

This piece features five long, pointed artificial nails arranged side by side, each inspired by candy. The first includes a raised, translucent gummy bear on a warm orange base. The second is glossy pink with small sprinkle-like dots and a white swirl. The center nail fades from pink to blue with a fine, sugar-like texture. The fourth is layered with curved, raised shapes in bright pink, blue, and green, creating a sculptural effect. The final nail shows a smooth spiral of pink, orange, and cream, resembling twisted hard candy, bringing the set together in a playful, sweet-inspired composition.

Rod Merrill, Lydia Echols, Brooke Alexander, and Miranda Reyes

Subject: Health, Nutrition & Clinical Sciences

Effects of Scatter Radiation on Occupational Dose

Scatter radiation creates the greatest amount of occupational exposure and greatest risk to radiologic technologists. Scatter radiation is a result of the primary beam interacting with irradiated tissues, which sends off secondary radiation in many different directions. Shielding and distance are known to prevent or lower occupational exposure. Location during the exposure is another preventative action. The ideal, proper location during exposure is behind a lead-lined wall that allows the technologist to be fully protected from any scatter radiation. Some facilities and the structures of the x-ray rooms do not offer full protection to radiographers. All precautions should be taken to decrease occupational dose in radiation workers.

Makayla Metcalf

Subject: Creative Works

Strawberries Pie Nails

The nail showcases a soft nude or milky base to highlight the artwork. The French tip is transformed into a realistic 3D strawberry pie crust, sculpted with textured ridges to mimic a golden, baked lattice. Glossy red 3D strawberries sit on top, complete with tiny hand-painted seeds and subtle highlights for a juicy effect. Clear sculpting gel creates a glazed, syrup-like shine, giving the pie a fresh, realistic finish. Small raised details add depth and dimension, making the design pop from every angle.

Amina Miljkovic, Kristin Van de Griend, Sarah Robey, and Margaret Zajanc

Subject: Health, Nutrition & Clinical Sciences

Determinants of Oral Health Care Among Idahoan Pregnancies: Pregnancy Risk Assessment Tracking System (PRATS) Analysis

To determine the associations between prenatal dental care utilization and its impact on birth outcomes in Idaho. Idaho Pregnancy Risk Assessment Tracking System (2019) data was used to explore oral health care utilization among pregnant people and associations with poor birth outcomes. We conducted chi-square, bivariate, and multivariate logistic regression analyses. Variables included sociodemographics, dental health care, risk factors during pregnancy, and birth outcomes. Independent variables were sociodemographics and risk factors during pregnancy, whereas dental health care and birth outcomes were dependent variables. All estimates were weighted; p < 0.05 was considered statistically significant. A total of 1,460 participants were included in the 2019 PRATS survey results. In the bivariate analysis, Hispanic pregnant populations were at a higher risk of not receiving routine dental care (odds ratio [OR] = 1.79; 95% confidence interval [95% CI] = 1.33-2.41) than non-Hispanic pregnant populations (OR = 0.93; 95% CI = 0.89-0.97). Birth outcome analysis is underway and will be reported. This study underscores the importance of oral health care utilization during the prenatal period among Idahoans.

Veronica Miller, and Zackry Merril

Subject: Biological & Natural Sciences

Enhanced Properties of Polymerized Garlic Essential Oil with Plant Extracts and Elemental Sulfur

Inverse vulcanization is a polymerization method that employs elemental sulfur, a byproduct of petroleum refinement, as the solvent, monomer, and initiator to create high sulfur-content polymers. Garlic essential oil (GEO), primarily composed of allyl sulfides, has the potential to replace elemental sulfur as a renewable feedstock in polysulfide synthesis, as it can form sulfur radicals upon heating to initiate polymerization. Although GEO successfully initiated the synthesis of adhesive polysulfides, further investigation was conducted improve the performance and sustainability of these adhesives by polymerizing GEO with various plant extracts. These renewable plant extracts were selected for their ease of cultivation and abundance in arid climates and poor soil. Local plants were collected, sonicated, and underwent rotary evaporation to obtain extracts that were polymerized with GEO. Further investigation focused on characterizing the best performing GEO-plant extract polymers using ^{1}H NMR, ATR-FTIR spectroscopy, DSC, TGA, and solubility testing. Adhesive performance of the polymers was then evaluated by measuring the maximum adhesion strength and work of adhesion. Results from adhesion testing revealed that GEO-plant extract polymers exhibited superior adhesive performance compared to poly(GEO) alone. Due to the solvent resistance and hydrophobicity of polysulfides, these polymers were further analyzed for their potential applications as coatings. The content of sulfur, GEO, and the plant extract were varied, and the solvent resistance and hydrophobicity of the resulting polymers were assessed. This research demonstrates that incorporating sustainable and renewable materials can improve polymer performance while advancing more sustainable, eco-friendly options in polysulfide applications.

Sanaly Nava, Dishant Aggarwal, Samjhana Pradhan, Ken Aho, Cynthia Blanton, Javier Ochoa Reparaz, and Kavita Sharma

Subject: Health, Nutrition & Clinical Sciences

Assessing the Potential of GABA-Producing Probiotics for Healthy Aging

Aging is a gradual process of weakening bodily functions that leads to decline in physical, cognitive, and behavioral abilities. Gamma-amino butyric acid (GABA), a major inhibitory neurotransmitter in the central nervous system, is produced by both neurons and gut bacteria, and plays a crucial role in numerous physiological functions. We aim to determine whether levels of key neurochemicals, including GABA, glutamine, succinic acid, and glutamic acid, change with age, and explore if this probiotic strain, P8, can play a role in maintaining these key chemical messengers through its influence on the gut-brain axis. To evaluate our hypothesis, we will utilize a live, genetically modified bacterial strain, P8, to assess its impact on neurotransmitter levels in fecal matter, serum, and brain tissues. The P8 probiotic will be administered to adult, healthy SD rats via oral gavage. Subsequently, fecal and blood samples will be collected for analysis. Changes in neurotransmitter concentrations will be quantified using liquid chromatography-mass spectrometry (LC-MS/MS). Our goal is to understand how this probiotic impacts the intricate communication between the gut and the brain by precisely measuring changes in neurochemical levels. This knowledge has the potential to unlock novel therapeutic pathways for fostering healthy aging and alleviating age-related cognitive deficits.

Hailey Neubauer

Subject: Creative Works

Blueberry Pie

For this set of acrylic nails, I created a design inspired by the look and texture of a blueberry pie, combining sculpted acrylic with detailed 3D art elements. I began by prepping the natural nails through sanitizing, shaping, buffing, and applying primer to ensure proper adhesion. Once the nails were prepped, I applied acrylic to build strong, structured extensions, shaping them evenly for a smooth and durable base. After the acrylic cured and was refined with filing and buffing, I began creating the blueberry pie design. I used a nude and golden-brown tone to represent the pie crust and blended deep blue and purple shades to mimic the appearance of blueberry filling. The colors were carefully layered and detailed to give the nails a realistic and artistic look. To enhance the design, I added 3D art using sculpting acrylic. I hand-crafted individual blueberries and textured pie crust pieces to create dimension and realism. One nail featured a fully sculpted 3D pie design, complete with raised crust edges and rounded blueberries that appeared as if they were spilling out of the pie. This nail served as the focal point of the set and required precise shaping and patience to achieve a balanced and detailed result.

Once all 3D elements were secured and fully cured, I sealed the entire set with a glossy top coat to protect the artwork and give the nails a polished finish. The final look combined creativity, technical skill, and texture, transforming a dessert concept into a wearable piece of nail art. This set demonstrates my ability to use acrylic, color blending, and 3D sculpting techniques to create a unique and visually striking nail design inspired by everyday objects and food themes.

Lauren Owens, and Caryn Evilia

Subject: Biological & Natural Sciences

Random Hexamer PCR Amplification from Low Concentration Jurassic-Aged Halite

The Redmond Salt Mine is a vertical salt mine estimated to extend nearly 5,000 feet deep. Its salt deposits were formed during the evaporation and crystallization of ancient seawater, that ancient sea water being the remains of the Jurassic-aged inland Sundance Sea. As salt crystals formed, microorganisms may have become trapped within the crystal structures, creating a sealed and salty environment. By slowing the degradation, the salt may have acted to create a natural preserve for these organisms that extended over large geological time. Halophilic microorganisms possess special and unique adaptations that allow for survival under extreme conditions, in this case, extreme high salinity, making them important models for studying extremophiles. Recovery of amplifiable, low-concentration DNA from these deposits would provide valuable information on the limits of biomolecular preservation across deep time. This study looks to explore and evaluate the practicality of amplifying unknown, low-concentration environmental DNA using random-tagged hexamer primers and extended polymerase chain reactions (PCR). A known DNA mixture was serially diluted and amplified across varying primer concentrations to evaluate the primer sensitivity, consistency, and reproducibility. Preliminary results demonstrate successful amplification at certain concentrations, as shown by distinct PCR bands. However, additional work is being done to improve consistency of PCR products. Further research and optimization are needed to confirm the necessary reliability to continue on to the Redmond environmental samples.

Reagan Piel, Makenzie R. Reed, and Devaleena Pradhan

Subject: Biological & Natural Sciences

Body Orientation During the Performance of Parental Behaviors in the Bluebanded Goby (Lythrypnus dalli)

Vertebrate species show multiple styles of parenting including biparental, maternal (female only), paternal (male only) care, alloparental, or no parental care. Lythrypnus dalli is a social-living, bidirectionally sexually plastic fish that utilizes paternal care. This study focuses on examining the body orientation of the male parental behaviors categorized as fanning and rubbing. The main difference between these behaviors is rubbing includes the belly touching the nest or eggs while moving its body and fins. These behaviors displace water to aerate the eggs. To accomplish this, we used a high-speed camera to record the male during its display of parenting behaviors in a nest tube. We recorded the overall social behavior of the group simultaneously with the high-speed recordings. We recorded stable groups twice for one hour. The two sets of videos were separated by one week to ideally collect data with and without embryos present in the nest. Overall social behaviors were analyzed using KINOVEA, where we counted behaviors including approaches, displacements, solicitations, and time in the nest tube. We extracted every 0.25 seconds of each high-speed video using Matlab and marked the frames using ImageJ to determine the orientation of the fins in relation to the head. The high-speed videos were used to determine how long each of the parenting bouts were. We have found that some spend a wide variety of time parenting, while others stick to a uniform time per bout. I predict we will find the dorsal fin will be in the same plane as the head for most parenting behaviors. I also predict that males with less parental bouts will have more aggressive behaviors, but will parent with or without embryos present. The data is important to determine how the male is moving while performing parental care, thus opening the lab to further studies.

Lucas Popovich, Owen Moses, and Timothy Kampworth

Subject: Engineering, Physical & Mathematical Sciences

DOE Package Testing Requirements

The purpose of this study is to determine the fitness of a package for use in transporting radiological materials. The Department of Transportation (DOT) has very strict guidelines for packages, and has a series of tests that must be conducted before a package can be certified. The package being tested in this study has a hard plastic shell and a shaped

foam interior, and falls into the Type A category of radiological packaging. Type A packages are designed to contain limited volumes of low-activity nuclear materials, even if they are subjected to extreme conditions. Tests are administered to simulate extreme mishandling in transport, and are conducted in a short period of time to mimic a worst case scenario. The tests the package will be subjected to are as follows: Simulated rainfall for an extended period of time. A drop test where the package is dropped from several feet onto its weakest point. A puncture test where a steel rod is dropped onto the package. A crush test where the package must support five times its own weight. During testing the package will be in this configuration: Glass vials will be filled with dyed water to represent our radiological materials. The vials will be placed in individual lead containers or "pigs" approximately five inches long and 3 inches in diameter. The pigs will be placed in the shaped foam lining of the hard shell package in such a way that they cannot move around the package. While this package will be used for transporting solid materials, the use of a liquid will better allow evaluation of any failures the package experiences. If any of the liquid escapes both the lead pigs and the package during testing, the package will not be certified by the DOT.

Lily Rasmussen

Subject: Creative Works

Tomato Tomatah

Using hot glue, nail polish, bobby pins, hair ties, and a wig, this spring-inspired hairstyle reimagines the vibrant form and movement of tomatoes. The sculptural design blends cosmetology techniques with mixed-media elements to create a playful yet refined interpretation of organic shape and color.

Saige Rigby, Larisa McOmber, and Kinta Serve

Subject: Biological & Natural Sciences

Effects of Asbestos Dosage on Kidney IgG Deposition

Immunoglobulin-G (IgG) is the most common serum antibody, making it a good indicator of immune activity. IgG deposits in the kidney have been associated with autoimmune disease, which has also been attributed to asbestos exposure. Asbestos, a mineral fiber, was used for its heat-resistant properties in construction and other industries. However, the body's inability to break down asbestos leads to a prolonged immune response causing conditions such as pleural fibrosis, malignant mesothelioma, and autoimmune conditions including rheumatoid arthritis. In this study, we have compared environmental and occupational exposure to Libby Amphibole (LA) asbestos by exposing a mouse model to low and high doses. We used an immunofluorescent stain to identify IgG deposits in kidney tissue four months after exposure.

Amariah Rodriguez

Subject: Creative Works

The Hairy Harvest

The Hairy Harvest is a bold and imaginative sculptural hairstyle crafted on a mannequin, transforming ordinary hair into a striking autumn centerpiece. Using spray glue adhesive and a comb, the hair was carefully slicked back to create a smooth, polished surface - creating a clean, sculpted foundation.

Allie Rogan, Haze Lwin, and Heather Ray

Subject: Biological & Natural Sciences

Masp1 Impact on Extracellular Regulators of Bmp4 Signaling During Early Xenopus laevis Development

3MC syndrome is an autosomal recessive developmental disorder that can be caused by a mutation in the MASP1 gene. MASP1 is known to act as a secreted protease in the immune system, but 3MC patients present with craniofacial malformations and neurological problems. These phenotypes suggest a role for MASP1 in embryonic development that is not explained with our current knowledge of MASP1 function. Our previous data, using Xenopus laevis as an investigative model, showed that Masp1 could be impacting craniofacial and neural development by ensuring the proper balance of neural and neural crest cells. Bmp signaling specifies these cell types in a concentration dependent manner. During gastrulation a Bmp4 gradient is formed across the dorsal-ventral axis by opposing secretion of Bmp4 and its multiple inhibitors. Our evidence indicates that Masp1 is influencing this gradient through its protease activity, but its exact mechanism within this pathway is currently unknown. Here, I am investigating the impact Masp1 has on the Bmp4 inhibitory proteins, follistatin

(Fst) and noggin (Nog) at both the gene expression and protein functional levels. In situ hybridization experiments show that Masp1 does not have an impact on fst expression but does alter the expression of nog. To study the functional impact of Masp1 on Bmp4, Fst, and Nog at the protein level, I am performing dual luciferase assays that provide a readout of active Bmp4 signaling. I have found that while injection of bmp4 mRNA alone induces robust reporter activity, co-injection of masp1 mRNA significantly reduces bmp4 signaling in a dose-dependent manner. Current experiments are looking at how Masp1 impacts the known inhibitory function of Fst and Nog on Bmp4 signaling. Overall, this will increase our understanding of the mechanisms underlying 3MC Syndrome.

Mateya Rogers and Sydney Summers

Subject: Health, Nutrition & Clinical Sciences

Effect of OID on Radiographic Magnification

The lowest achievable object-to-image distance (OID) reduces magnification on radiographs and increases validity and accuracy of the image. Increased OID can lead to overestimation of surgical implant size, resulting in mismatch and instability in joint replacements. The magnification factor (MF) is used to determine how much larger the anatomy appears on the image compared to its actual size. Magnification has a significant impact on AP knee radiographs because patient habitus and cooperation can increase the distance between the back of the knee and the image receptor (IR). This experiment was conducted to evaluate the degree of magnification present in clinical settings. Consistency in OID between examinations is essential for accurately identifying trends and ensuring reliable assessment of joint space and implant size. Limited research has been published on this topic despite its clinical impact.

Crystal Ruvalcaba and Olivia Jensen

Subject: Health, Nutrition & Clinical Sciences

Light Field Accuracy (Congruence)

Light and x-rays follow the same principles for diverging paths. The light field is what radiographers use to properly position patients and limit exposure. It is imperative the light field closely correspond to the x-ray field. The pennies were placed approximately on the same black line outlining a rectangle on the detector, which corresponded to the light collimation. After measuring the pennies in accordance with the light field, it was found that 8/16 pennies were equal to or outside the 2% allowance. The ultimate reasoning for misalignment is wrong angulation of the mirror within the collimator. Possible causes include wear and tear, rough handling, and low or infrequent maintenance. Misaligned collimation could lead to clipped anatomy, repeated exams, and unnecessary exposure.

Wyatt Schliesleder and Gavin Bissell

Subject: Health, Nutrition & Clinical Sciences

Not Your Average Package: Engineering Safety in Nuclear Material Transportation

The transportation of radioactive materials is governed by strict regulatory and engineering standards designed to protect the public, workers, and the environment. This project examines the structural design principles and performance requirements of Type A and Type B packaging used in nuclear material transport. Although often perceived as ordinary shipping containers, these systems are engineered containment structures built to withstand mechanical, thermal, and environmental stress under both routine and accident conditions. This poster integrates technical analysis with visual representation to illustrate defense-in-depth principles. Layered graphics and cross-sectional diagrams demonstrate how impact absorption, shielding, and redundancy function within each package type. Dimensional contrasts and structural outlines emphasize that transport safety is achieved through engineered containment systems rather than outward appearance. Federal transportation standards governing radioactive material packaging were analyzed to compare required performance testing criteria. Type A packages are evaluated against normal transport conditions, including water exposure, free-drop impact, stacking, and puncture resistance. Type B packages are tested under hypothetical accident conditions, including a 30-foot drop onto an unyielding surface, puncture testing, thermal exposure at 800°C (1475°F), and water immersion. Scaled visual models were created to represent structural differences in shielding, reinforcement, and containment design. Comparative analysis demonstrates substantial differences in structural robustness and survivability requirements between the two package types. Type A packaging ensures containment for lower-activity materials during routine transport, while Type B packaging incorporates multi-layered shielding and structural reinforcement to maintain integrity during severe accident scenarios.

Ultimately, nuclear transportation safety is achieved through deliberate engineering design and regulatory oversight. Type A and Type B systems reflect a graded approach to containment that ensures secure transport across varying levels of radioactive material.

Kenadee Searle, Jocelin Pelayo-Cardona, and Kylie Higdon

Subject: Health, Nutrition & Clinical Sciences

Radiation Exposure and Pediatric Diapers

Radiation protection is critical in pediatric imaging due to children's increased sensitivity to ionizing radiation. Disposable diapers, commonly present during radiographic exams, contain absorbent materials that can increase attenuation and create artifacts, potentially leading to higher exposure settings or repeat imaging. This study evaluated three diaper brands (Huggies, Pampers, and Luvs) in dry and simulated wet conditions using a standardized radiographic technique. Exposure index values were compared to assess differences in radiation absorption. Results showed that all diapers produced artifacts, with Huggies demonstrating the most consistent exposure between dry and wet states, indicating the least additional attenuation. These findings highlight an often-overlooked factor that can impact dose optimization and image quality, reinforcing the importance of technologist awareness and adherence to ALARA principles in pediatric care. This project applies radiation safety concepts to a real clinical scenario, demonstrating how small practice changes can reduce unnecessary exposure and improve imaging outcomes. It reflects Idaho State University's focus on evidence-based practice, patient safety, and preparing students to identify and solve clinical problems through research.

Madelyn Shaw, Laurana Anderson, and Katelyn Cathcart

Subject: Humanities, Behavioral & Social Sciences

Disability Bias in Clinical Psychology Program Admissions in the Pre-Application Stage

Research exploring the experiences of disabled psychologists highlights both challenges they face and unique contributions they bring to clinical practice. Disabled psychologists often develop strong rapport with clients of similar backgrounds and engage in meaningful advocacy (Battalova et al., 2020; Lund et al., 2020). However, evidence also indicates that disabled trainees encounter barriers that limit or prevent entry into doctoral programs (Coop, 2018). Despite ongoing efforts by the American Psychological Association to increase diversity, disability remains underrepresented, potentially due to biases within graduate admissions processes (Francis, 2024). Disclosure of mental health conditions on application materials has been associated with lower faculty rankings compared to applicants who do not disclose such information (Zöld et al., 2020). Building on this literature, the present study examined whether bias emerges even earlier—during the pre-application stage, when prospective students contact potential mentors. We will present the results of a nationwide audit study of 400 APA-accredited clinical psychology programs in this poster. One faculty member from each program was randomly selected to receive an email from a confederate prospective student inquiring about program fit and faculty availability. Email conditions varied by disclosure of disability status. Response rates and related variables were recorded. The immediate results indicated that students who disclosed a disability received significantly fewer responses compared to those in the control condition, $\chi 2 = 4.61$, $p = .022$. These findings suggest that disability-related bias may influence opportunities at the very first point of contact with graduate programs. Further analysis of response emails is currently underway. Emails were individually coded by four undergraduate research assistants across 11 communication variables, including perception of warmth, degree of encouragement, and formalness. Statistical testing on these coded results is in progress and will be available by March 18th. This may provide meaningful implications for admissions policies and equity in training pathways.

Alisa Smith

Subject: Creative Works

Taco Tuesday

For this set, I created a vibrant Mexican-inspired acrylic nail design that celebrates bold culture, bright color, and dimensional artistry — finished with a playful 3D "Taco Tuesday" feature nail. This set was designed to demonstrate advanced sculpting, color theory, structural balance, and controlled 3D acrylic application while celebrating Mexican cultural elements through dimensional storytelling.

Tessa Smith and Abigail Harper

Subject: Health, Nutrition & Clinical Sciences

Scatter Levels by Height in a Danelius-Miller Method

The Danelius-Miller (DM) cross-table lateral hip view is a common radiographic projection used in trauma and postoperative settings. Because the technologist often holds the imaging receptor (IR), this projection raises occupational exposure concerns due to the high radiation dose and proximity to scatter radiation. The objective of this study was to measure the scatter radiation exposure to radiosensitive areas of the technologist's body during a DM projection. Previous research indicates elevated scatter radiation during cross-table hip imaging, but few studies have quantified the dose at specific heights of the technologist's body. Noting that many technologists hold the IR without full shielding, we aimed to measure scatter doses to radiosensitive anatomy, such as the eyes, thyroid, chest, and gonads. To conduct our experiment, we replicated the DM method in an x-ray room at a local hospital using a water-filled computed tomography phantom to simulate the patient's hip. We implemented the recommended collimation size and source-to-image distance (SID) from Bontrager's Textbook of Radiographic Positioning and Related Anatomy and used a common technique of 80 kVp at 80 mAs for every exposure made. Additionally, a separate IR was placed at four varying heights representing different anatomical parts of the technologist standing behind the patient's hip. Three exposures were made at each height, and the S-number (a measure of radiation) was recorded. Our results showed that the highest radiation exposure occurred at pelvis level, approximately 96 cm from the ground, followed by head level (170 cm) and chest level (138 cm). No radiation was detected by the IR at foot level (8 cm). The S-number recorded at the pelvis level was indicative of a diagnostic x-ray, which is concerning. In conclusion, the use of lead shielding, particularly for the thyroid and eyes, is strongly recommended for technologists holding the IR during a DM projection.

Wyatt Somers, and Daniel Larkin

Subject: Engineering, Physical & Mathematical Sciences

Pressure Cured Concrete

Concrete is the most widely used construction material worldwide, and its mechanical strength is critical for structural performance and durability. Mechanical strength can often be improved through early-age curing, thereby enhancing long-term performance. Cement production is energy-intensive and generates significant carbon dioxide emissions, improving early-age mechanical performance offers an opportunity to reduce cement usage, extend service life, and lower the environmental footprint. Prior studies at ISU and other institutions have shown that applying pressure during early curing, known as compression curing, can increase concrete strength by reducing porosity and increasing density. This study expands on pressure curing by evaluating the effectiveness of both pressure and vacuum treatments applied to concrete mixtures and aggregates to improve compressive and tensile strength. A custom pressure chamber has been designed and constructed to test a range of configurations under controlled pressure and vacuum conditions. Testing configurations include pressurizing concrete mixtures prior to casting, vacuum treatment both before and after casting, and pressure or vacuum treatment of aggregates prior to mixing. Each test setup will be cast in 2x4 cylindrical molds and include an equal number of experimental and control specimens subjected to standard curing conditions. Specimens will be tested at 7 days in compression and indirect tension. Strength values will be calculated and compared against the control specimens to determine the effectiveness of each approach. By systematically comparing densification mechanisms induced by both positive and negative pressure environments, this research seeks to establish a practical framework for compression-assisted curing technologies. The results of this study will provide insight into the effectiveness of pressure and vacuum processing techniques for enhancing concrete mechanical properties and contribute to connecting laboratory-scale innovation with field-applicable methods.

Mika Spafford and Caryn Evilia

Subject: Biological & Natural Sciences

Morphology and Metal Tolerance of Halophilic Archaea from The Great Salt Lake

The Great Salt Lake (GSL) is the 10th most saline lake in the world, with a salinity of 5-27%. The extreme environment allows extremophilic organisms to thrive within the lake. One specific type of organism that lives predominantly in the northern part of the lake is halophilic archaea. Halophilic archaea are aerobic organisms that have various morphologies, including rods, cocci, and spirals. Bacterial and eukaryotic organisms are well-studied and understood, but relatively little is known about archaeal organisms, which share some similarities with both types of organisms. To aid in characterizing the archaeal

organisms in the GSL, various colonies of halophilic archaea were inoculated into liquid media. The purity and morphologies of the colonies were determined once sufficient growth was present. The morphology of different halophilic archaea facilitates the identification of the specific strain being investigated. One particular strand of haloarchaea (NRC-1) was inoculated into liquid CM+ media, which were then introduced to increasing concentrations of various metal salts that are present in the GSL. The optimal density (OD) of the organisms was measured throughout the growth period. The log phase of the growth curve was graphed and showed variations in growth as the concentrations increased. Overall, as the concentration of the metal salt increased, the growth of the halophiles decreased. The tolerance of halophiles provides insight into the extreme environments in which these organisms can exist. Characterizing these extremophiles presents various benefits in environmental and microbial sciences. Due to changing climates, it is crucial to study these organisms before the GSL dries out completely and the halophiles no longer exist.

Michael Strickland

Subject: Humanities, Behavioral & Social Sciences

The Black History of Pocatello, Idaho: Community, Resilience, and Civil Rights in the American West

This presentation examines the overlooked history of African Americans in Pocatello, Idaho. This small city, for much of the 20th century, had the highest percentage of Black residents in the state. Challenging the perception of the American West as significant only to white settlers, the research explores how Pocatello's Black community built vibrant institutions. They fought discrimination and achieved political representation despite comprising less than 2.5% of the local population. The study centers on the Historic Triangle Neighborhood. Emerging around 1900 as Idaho's most diverse community, the Triangle was shaped by segregation and discriminatory housing practices. These concentrated African Americans and other minorities east of the railroad tracks. Despite these constraints, residents established lasting institutions. The most notable is the Bethel Missionary Baptist Church (1920), which served as both a spiritual anchor and a base for civil rights activism. The presentation traces three critical periods: 1) the early 20th century formation of the Triangle community; 2) the World War II era, when the Naval Ordnance Plant drew African American workers and swelled the Black population to 500–600 residents; and 3) the Civil Rights era of the 1950s–1970s, when local activists challenged discriminatory practices head-on. A particularly notable achievement came in 1961, when a coalition of Black, Asian, and Native American citizens secured passage of Idaho's civil rights law. This was three years before the federal Civil Rights Act. They demonstrated the power of multiracial organizing in predominantly white states. The research also highlights Thomas "Les" Purce, elected as Idaho's first Black city council member (1973) and mayor (1976). The study concludes with recent preservation efforts, including the 2021 National Register designation of Bethel Church as Idaho's first African American Civil Rights property.

Levell Strong, and Hannah Archibald

Subject: Health, Nutrition & Clinical Sciences

Quantitative Assessment on the Effect of Distance and Position on Scatter Radiation

Scatter radiation is an occupational hazard to radiologic technologists. Many radiography exams are taken via mobile exam increasing the risk for technologists. This study quantitatively assesses the effects of scatter radiation at varying distances and angles. This experiment utilizes a portable x-ray unit, anthropomorphic phantom, measuring tape, and IR detector to evaluate scatter radiation received by technologists. It measures scatter radiation received by technologists during a portable abdomen exam at distances 2ft, 4ft, 8ft, and positions from behind the cr, to the side of the patient, and in front of the patient. This study confirmed the inverse square law indicating an exponential decrease in scatter radiation to the technologist as distance from the patient increases. The scatter radiation pattern is also demonstrated with this experiment, confirming a circular pattern from the patient with scattered photons traveling in a straight line. This study found a lower amount of scatter radiation received from behind the cr, in front of the patient was intermediate, and the highest amounts were recorded coming from the side of the patient. Overall technologists should be encouraged to utilize distance as the most effective way to reduce scatter radiation received, as well as standing behind the CR whenever possible and to avoid standing to the side of the patient.

Sydney Strong

Subject: Creative Works

Inverted Harvest

This work is a food inspired project titled Inverted Harvest- displaying an upside down salad. This project was crafted with synthetic hair, tissue paper, cotton balls, pipe cleaners, a plastic bowl, mannequin head, paint, and hot glue.

Reace Swore

Subject: Creative Works

Sushi

I took solid gel, watercolor and gel nail polish to create this semi realistic set of nails. I took the gel and made shapes, placed them onto the nail and then hand painted all the designs on. I love sushi so when the assignment was to do good theme nails, I knew immediately I had to do it.

Zoe Tassava and Cory Bennett

Subject: Education, Learning & Training

Supporting Remedial Mathematics Students using Online Assessment Scaffold-Feedback

The evolution of mathematics learning in higher education has highlighted two important recent trends in teaching: A shift to online assessments and an increase in remedial mathematics courses. An important question emerges in the intersection of these two shifts: what process helps instructors build immediate feedback into online formative assessments that increases student learning, overcomes misconceptions, and develops self- and metacognitive regulation in the independent learner space? We provide a framework for thinking about and generating feedback in online assessments. Using a qualitative case study approach, we analyzed student-input responses from pre-college remedial mathematics quizzes that allowed multiple attempts per question. The research team analyzed students' mathematical work to identify patterns of common errors across problem types and were coded to represent distinct error-type domains. These patterns and common error-type domains allowed the research team to create error-type domain specific scaffolded feedback targeted to address computational errors and potential misconceptions which were activated only when a correlated error-type response was entered by a student. Rather than supplying explicit corrections, the feedback provided cues, strategic prompts, and other error analysis guidance designed to reorient student thinking to key mathematical concepts while preserving cognitive demand. Data were drawn from a single semester cohort, limiting generalizability but enabling close examination of authentic student work. Preliminary implementation suggested that specific error-type scaffolded feedback was both feasible and pedagogically aligned with research on high-impact feedback. This approach offered instructors a replicable framework for leveraging existing online tools to promote conceptual understanding, procedural fluency, and metacognitive regulation without substantially increasing workload for instructors. By shifting from simple answer verification to scaffolded intervention, online formative assessment can become a structured space for independent learning, rather than passive answer checking, that better aligns to learning mathematics.

Noah Thompson, David Burnett, and Julia Martin

Subject: Biological & Natural Sciences

Investigating the role of inorganic phosphate in Streptococcus pneumoniae capsular polysaccharide production

Capsular polysaccharide (CPS) is a major virulence determinant for many human-pathogenic bacteria, including Streptococcus pneumoniae. CPS production and overall thickness changes in response to available oxygen, carbohydrate, and metal ions in host environmental niches where S. pneumoniae colonizes. CpsB, a manganese-dependent phosphotyrosine-protein phosphatase, is also a modulator of capsule production. CpsB dephosphorylates autophosphorylated CpsD, a cytoplasmic phosphotyrosine-protein kinase. Cycling of the phosphorylation state of CpsD promotes the proper synthesis of CPS and deviations from this cycle significantly reduces CPS levels and decreases bacterial virulence and colonization of the host. As such, a continuous supply of inorganic phosphates is required for S. pneumoniae CPS production. It has also been shown in-vitro that inorganic phosphate may form small molecule complexes with manganese functioning as catalase mimetics that help increase survival of S. pneumoniae against host defenses. To date, our understanding of how the intracellular inorganic phosphate pool is regulated and maintained is limited. Using

bioinformatics gene alignment tools, we identified a manganese-dependent inorganic pyrophosphatase, PpaC (spd_1363). Here, we construct a null-deletion of ppaC in S. pneumoniae using the Janus cassette allele rpsL+ replacement method and counter-antibiotic selection. ppaC mutant isolates were PCR and sequence verified. Null-ppaC mutant strains will be examined for growth phenotypes and inorganic phosphate levels. Data collected will improve our understanding of how S. pneumoniae manages and regulates its intracellular inorganic phosphate pool and its impact on CPS biosynthesis.

Beezy Weigle

Subject: Creative Works

Taste of ISU

The food I chose was Cotton candy Ice cream. The first thing I did was buy acrylic paint professional markers to paint a make up to look like ice cream melting down the mannequin's face. I used original Baskin-Robbins 14 Oz pre-packed containers. I used 3 screws to drill into the containers to hold in place on top of the mannequin head. I used pink temporary hair spray to turn the blue hair into a cotton candy look. I also used a glue gun to glue hair extensions in to make the back of the hair complete, I used a stable gun and hot glue gun to male sure the hair would hold in place. I also used regular hair spray to complete the look.

Isaac Wickard, Sydney Morris, Markus Pettinger, Kevin Smith, and Colton Hanning

Subject: Engineering, Physical & Mathematical Sciences

Vending Machine "Digital Twin"

This project investigates the design and implementation of a digital twin for a vending machine to improve monitoring, diagnostics, and inventory management. The goal is to determine whether integrating real-time sensor data with a virtual system model can enhance operational decision-making without direct interaction with the physical device. The system integrates internal sensors that detect product dispense events and transmit data through a microcontroller to a remote server. The server processes and analyzes machine activity while a digital interface displays operational status and inventory information. The digital twin mirrors the physical structure and behavior of the vending machine, enabling operators to observe performance and test system changes within a virtual environment. Preliminary development indicates that combining embedded sensing with server-based analytics provides continuous visibility into machine operations and supports predictive restocking strategies. The digital twin framework also enables firmware testing, performance evaluation, and future expansion into remote management and energy optimization features. Therefore, the proposed digital twin architecture demonstrates strong potential for improving vending machine reliability, reducing downtime, and supporting scalable logistics and inventory optimization.

Ava Wilson

Subject: Creative Works

Taste of ISU

For my Taste of ISU project, I created a fish made out of hair, decorated with sushi and chopsticks. I chose this design because I am half Korean, and I wanted to represent my culture in a creative way. Food is a big part of Korean culture, and sushi is something many people recognize, so I thought it would be a fun and meaningful way to share that with others. By combining hair art with cultural elements, I wanted to bring a piece of my identity to ISU and celebrate diversity in a unique way.

2025 Research and Creative Works Symposium Award Recipients

Graduate Oral Presentation Award Recipients

Top Oral Presentation in Biological & Natural Sciences
Pooja Sapkota
"Positive Allosteric Modulators (PAMS) of $\alpha 9\alpha 10$ nicotinic acetylcholine receptors (nAChRs) for the treatment of hidden hearing loss"

Top Oral Presentation in Business, Economics & Public Administration
Rehnaz Karanjia
"Feedback-Seeking in Remote Work: How Leaders Stay in Touch Without Being in Touch"

Top Oral Presentation in Education, Learning & Training
Emily Fitterer
"Deafness and Autism"

Top Oral Presentation in Engineering, Physical & Mathematical Sciences
Md Fazle Rabbi
"From Discovery to Fix: The Journey of Software Vulnerabilities"

Top Oral Presentation in Health, Nutrition & Clinical Sciences
Dallen Farmer
"Eastern Idaho State Fair Public Safety Improvement Project"

Top Oral Presentation in Humanities, Behavioral & Social Sciences
Kierra Burns
"Medieval Milk"

Undergraduate Oral Presentation Award Recipient

1st Place Oral Presentation
Prem Shah
"Novel Light Absorbing Semiconductor Materials with Multinary Copper Chalcogenides"

2nd Place Oral Presentation
Andrija Sevaljevic
"Redux: An Interactive, Dynamic Knowledge Base for Teaching NP-completeness"

Graduate Poster Presentation Award Recipients

Top Poster Presentation in Biological & Natural Sciences

Anna Sniadach

"Mountain spring controls on stream water quality and quantity in the non-perennial Gibson Jack watershed in southeastern Idaho"

Top Poster Presentation in Business, Economics & Public Administration

Susana Agudelo

"Leveraging Artificial Intelligence to Enhance Functionality of Electronic Health Records"

Top Poster Presentation in Education, Learning & Training

Emilee Knapp

"Improving Provider Knowledge of The Importance of Patient Education on Potential Mental Health Adverse Effects Associated with Hormonal Contraception"

Top Poster Presentation in Engineering, Physical & Mathematical Sciences

Saugat Dotel

"Laboratory Evaluation of Glass Fiber Reinforced Polymer (GFRP) Bars to Improve Joints in Natural Fiber Reinforced Concrete (NFRC) Pavements"

Top Poster Presentation in Health, Nutrition & Clinical Sciences

Christopher Nicolet

"In silico Guided Modulation of Mechanotransduction Channels in Zebrafish"

Top Poster Presentation in Humanities, Behavioral & Social Sciences

Spencer Moore

"Building a Virtual Skeleton: Preservation of Human Skeletal Remains through Digitization at ISU"

Undergraduate Poster Presentation Award Recipient

1st Place Poster Presentation

Diana Cortez

"Step-By-Step: Treadmill Stepping Behaviors Following Spinal Cord Injury"

2nd Place Poster Presentation

Kyla Johnston

"Improving Organism Identification in the Great Salt Lake: A Metagenomic Study of the Three Domains of Life in a Hypersaline Environment"

Undergraduate Creative Works Award Recipient

Top Creative Works Presentation

Riley Ortiz

"Painting of the Pleistocene Epoch"

Fall 2025 Three-Minute Thesis Winners

Will Kimball

1st Place

Chemistry - MS

From Pollution to Purification: Sulfur Repurposed

Katelyn Cathcart

2nd Place

Clinical Psychology - PhD

Implicit Bias Toward Disability Disclosure in the Early Graduate Application Process

Michelle Collier

3rd Place

Public Administration - MPA

Every Second Counts: Building Stronger Rural Dispatchers

Brenda Phillips

People's Choice Award

Occupational Therapy - MOT

Survey of Assessments Used in Occupational Therapy

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