

CURC

Celebrate Undergraduate Research and Creativity Abstract Booklet

Colorado State University

April 17, 2025



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CURC 2025 is generously supported by the Office for Undergraduate Research and Artistry (OURA) and The Institute for Learning and Teaching (TILT).

Each year various CSU units, institutes, and colleges sponsor student awards to recognize creative and scholarly excellence presented at CURC. The sponsors in 2025 include:

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A letter from the Director of OURA

Dear CSU Community,

The Celebrate Undergraduate Research and Creativity (CURC) 2025 Showcase has arrived. This is an exciting event with a long history. More than 3 decades ago, the Office of the Provost began working with the College of Natural Sciences to facilitate the expansion of their annual research poster session into the university-wide event that we know today as the Celebrate Undergraduate Research and Creativity Showcase. With the inclusion of all disciplines represented at CSU, CURC showcases much more than traditional research. This year CURC will feature work from over 400 students. The types of submissions include: research, community engaged learning, creative writing, film, performing and visual arts.

To all of the students who are participating, let me just say how impressed I am by the level of dedication, skill, and creativity that you have demonstrated. You spent many hours researching and creating your projects and crafted posters, presentations, art, and performances of exceptional quality while doing so. Each and everyone of you should be proud of this accomplishment!

To our volunteers, thank you for helping the day of CURC run smoothly. To the editors of the Journal for Undergraduate Research and Scholarly Excellence, especially our Co-editors in Chief, Sophie Kiehl and Laura Bussard, thank you for putting this abstract booklet together and for making CSU proud to be home of JUR.

We are exceedingly grateful to the judges who dedicate their time to thoughtfully review posters and other works and provide feedback for students. We cannot pull off this event without your extensive help, as well as your support and encouragement. Thank you, thank you, thank you!

Thank you to The Institute for Learning and Teaching (TILT) and to all 8 colleges for supporting a campus-wide event of this scale. We thank the Energy Institute, and the Graduate School for sponsoring additional student awards. Many cheers to everyone who helped make CURC 2025 a success! Have a great CURC and remember that Research and Creativity are for everyone.

A handwritten signature in black ink that reads "Louise Allen". The signature is fluid and cursive, with the first name "Louise" written in a larger, more prominent script than the last name "Allen".

Louise Allen, Ph.D.

Director of Student Engagement

Program Director, Office for Undergraduate Research and Artistry ([OURA](#))

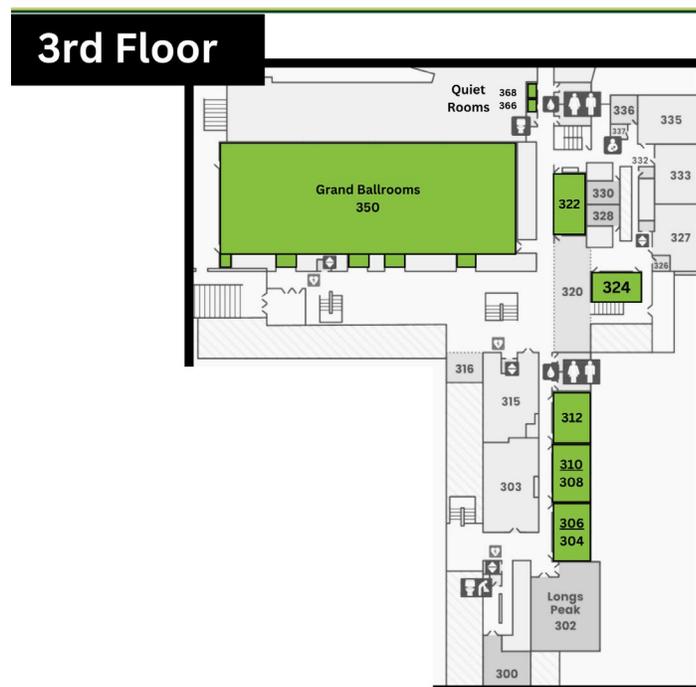
The Institute for Learning and Teaching ([TILT](#))

Schedule and LSC Map

Day-Of Schedule

**All events will take place in the LSC Grand Ballroom unless noted*

Time	Event
9:20am	CURC Opening
9:30am - 10:45am	Green Poster Session (Odd numbers)
11:00am - 12:15pm	Art Exhibition
11:00am - 12:15pm	Green Oral Presentation (LSC 304, 306, 308)
12:30pm - 2:00pm	Gold Oral Presentations (LSC 304, 306, 308)
12:30pm - 1:00pm	Performing Art
1:00pm - 3:00pm	Written Work (LSC 312)
1:00pm - 2:30pm	Pop-Up Opera (LSC Plaza)
1:30pm - 2:45pm	Gold Poster Session (Even numbers)
2:00pm - 4:00pm	Film Festival (LSC 322)



Celebrate Undergraduate

Research and Creativity

Colorado State University

April 17, 2025

College of Agricultural Sciences

O3 Accuracy of Artificial Intelligence Platforms on Equine Topics

Sonya Aldworth-Yang

Devan Catalano

College of Agricultural Sciences

Oral Presentation

Artificial intelligence (AI) is becoming increasingly popular as a resource for equine-related information. However, AI models pull from various sources and do not always distinguish between fact and opinion. This study evaluated the accuracy of AI-generated answers on equine topics from three AI platforms. We hypothesized that AI could answer basic questions well but would struggle with more complex topics. The AI platforms (P) evaluated were ChatGPT (CGPT), Microsoft Co-Pilot (MicCP), and Extension Bot (ExtBot). Researchers asked 40 questions covering horse care, facilities management, nutrition, genetics, and reproduction (topics; T) at four levels (L): beginner (beg.), intermediate (int.), advanced (adv.), and “hot topics” (HT). Answers were scored on accuracy, relevance, thoroughness, and source quality (10 pts each, total 40 pts). Data were analyzed using PROC GLM in SAS (v. 9.4). Both CGPT and MicCP answered 40/40 questions, while ExtBot answered 33/40. Total score was not affected by P ($p=0.197$) or T ($p=0.536$) but was affected by L ($p=0.002$), with beg. and int. scoring higher than adv. or HT. Accuracy varied by P ($p<0.001$), L ($p<0.001$), and T ($p=0.015$), with ExtBot scoring lower than CGPT and MicCP. Relevance was affected by P ($p=0.042$) and L ($p<0.001$), with CGPT providing more irrelevant details. Thoroughness differed by P ($p<0.001$) and L ($p=0.002$), with CGPT ranking highest. Source quality was affected by P ($p=0.037$), with ExtBot using the best sources. Overall, AI struggled with complex topics, highlighting the value of Equine Extension specialists.

R5 Visitor Demographics and Perceptions of the CSU Perennial Demonstration Garden

Sam Altaffer

Chad Miller

College of Agricultural Sciences

Research Poster

The Perennial Demonstration Garden, relocated to its current site in 2016, is a small-scale botanical garden showcasing a diverse collection of native and non-native perennial plant species. As the garden finishes its 8th year at this location, there is an increasing focus on enhancing the visitor experience. This research aimed to gather visitor feedback through the design and implementation of a survey, addressing key aspects such as how visitors discover and

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engage with the garden, space improvement suggestions, preferences for native species, and accessibility concerns. The survey results indicate that the majority of visitors are aged 50 or older, predominantly female, and primarily local to the Fort Collins area. While many visitors use the garden for learning (45.6%), others engage in relaxation (28.2%) or brief visits (26.2%). Key areas for improvement include expanded plant identification resources, increased signage on native species and pollinator benefits, and accessibility enhancements such as improved pathways and clearer labeling. Statistical analyses revealed significant relationships between visit frequency and garden utilization ($p = 0.029$), age and learning engagement ($p = 0.056$), and race and garden utilization ($p = 0.032$). These insights will help guide the development of the garden and its integration into the broader vision of the Garden and Art District.

R3 Hormonal Contraception Effects in Women with Multiple Sclerosis

Allie Arritola, Brett Fling, and Kristin Johnson

Brett Fling

College of Agricultural Sciences

Research Poster

Multiple Sclerosis (MS) is a chronic autoimmune disease that disproportionately affects women, many of whom use hormonal contraception (HC). Current evidence suggests that HC may improve MS symptoms, but research findings are mixed and limited to a few studies. This survey study aimed to fill this gap in research by characterizing the impact of HC on MS symptoms and functional abilities in women with MS. A total of 249 women with MS, age 39 ± 7 years, who used various forms of HC completed the survey. Participants were asked whether their MS symptoms (e.g., fatigue, muscle weakness, cognitive abilities) or physical functions (walking, balance, coordination) were changed by HC. Healthcare provider (HCP) communication was also assessed. Among participants using HC pills, 52- 95% indicated no symptom fluctuations across different phases of the pill cycle. Similarly, among those using other forms of HC, 80-89% reported no change in symptoms after starting HC. Among those who experienced adverse effects of HC, most (77.5%) had not discussed these effects with their HCP . These findings suggest that HC does not influence symptoms or physical functions in most women with MS. However, there is a need for improved patient-provider communication with women with MS who experience adverse effects from HC.

C2 Return to Land, Return to Knowledge, Return to Being; Indigenous Research & Land-Based Learning Initiative

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Camille Britt

Dominique David-Chavez and Tyrone Smith

College of Agricultural Sciences

Community Engagement Poster

Colorado State University's Indigenous Research and Land-Based Learning Initiative was created in 2022 by the Native American Cultural Center (NACC) in collaboration with Dr. Dominique David-Chavez's Indigenous Land and Data Stewards Lab. The goal of the initiative is to address critical programming gaps at the university through professional development-focused, experiential, land-based research and learning opportunities. Native Science and Indigenous research have been practiced for millennia but are currently underrepresented in academia due to the dominance of Western scientific approaches. In order to address these gaps, the initiative works to build relationships with Tribal leadership, Elders, Indigenous knowledge keepers, and language experts. These relationships also create opportunities that support faculty and student development through collaborative, interdisciplinary research, as well as community engagement. A few examples of these research opportunities include the NACC Research Property and the Laramie Foothills Bison Conservation Herd. Since 2022, twenty-four student researchers have collaborated on over twenty research projects in collaboration with four colleges, three Native Nations and multiple local organizations. In just three years, crucial impacts have been made towards campus collaborations, student success, advancing research, and fulfilling the land grant mission. Ultimately, this initiative contributes significantly to university advancement priorities defined by President Amy Parsons and Chancellor Tony Frank—particularly the missions of advancing research and improving access and inclusion in education.

R13 Turning Grass into Cash: an economic analysis of continuous-season- long grazing compared to rotational grazing systems in a semiarid rangeland

Rhyse Champion

John Ritten

College of Agricultural Sciences

Research Poster

This study evaluated the profitability of continuous-season-long grazing versus rotational grazing management at the Central Plains Experimental Range (CPER) in Nunn, CO. For over a decade, an experiment at CPER has compared traditional range management (TRM) with collaborative adaptive range management (CARM), which engages diverse stakeholders to balance ecological and economic goals. While CARM has documented ecological benefits including enhanced bird

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habitat and improved forage species composition, it incurs additional management and infrastructure costs as well as experiencing lower cattle weights at season's end. However, previous studies suggest that price slide effects may offset this impact and have the potential to make CARM more profitable in some scenarios. The objective of this study was to calculate the cost of providing these benefits by comparing the economic returns of TRM and CARM systems over ten years. The analysis was carried out by using historical cattle sale prices, infrastructure costs, and labor expenses. A Monte Carlo simulation showed TRM was more profitable 59.67% of the time, with a mean total net revenue of \$874,573.19 compared to \$804,020.31 for CARM. The forecast for the total profit of TRM over 10 years was \$232,779.21, while the forecast for CARM was \$127,596.62, These findings can guide producers in system selection and inform policy incentives for rotational grazing adoption.

R18 Monitoring insecticide resistance in major sugar beet pests

Ana de Zoeten, Ashley Raffa, and Punya Nachappa

Max Schmidtbauer

College of Agricultural Sciences

Research Poster

The Intermountain West is home to a thriving sugar beet industry. Idaho, with its temperate climate and access to the Snake River Basin, is consistently one of the top sugar beet producing states in the country. Sugar beet profits are based primarily on three criteria: yield, sucrose content, and sucrose recovery efficiency, but these criteria are certainly affected by insect pests. Insecticides are therefore a powerful tool used in pest mitigation strategies; however, overuse can lead to resistance within pests and the unintentional loss of beneficial insects. As a result of this, there is an apparent need to assess key pest susceptibility to commonly used insecticides. The goal of this research is to determine black bean aphid (*Aphis fabae*) and green peach aphid (*Myzus persicae*) resistance to a neonicotinoid, and lygus bug (*Lygus hesperus*) resistance to a pyrethroid. We hypothesize that our field collected insects will express some level of resistance to both insecticides. Preliminary data suggests that black bean aphids have some resistance to the neonicotinoid, but green peach aphids do not. It also shows that lygus bugs have a moderate resistance to the pyrethroid Asana. The future direction of this project is to evaluate insecticide efficacy on spider mites, another devastating pest of sugar beets. The long-term goal for this research is to help direct future pest management efforts to reduce the overuse of insecticides, in turn, mitigating rates of resistance in pest populations.

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R1 The Sound of Selection: Acoustic communication and the potential for brain steroid synthesis

Maddie Gaasch

Amir Alayoubi

College of Agricultural Sciences

Research Poster

While hormones, such as estrogens, are traditionally thought to change sex-specific phenotypes over time, they can act as powerful neuromodulators and influence behaviors in a matter of seconds. Cope's gray treefrog, *Hyla chrysoscelis*, females rapidly make acoustically guided mating decisions in noisy ponds—offering an opportunity to learn more about how rapid estradiol synthesis promotes sensory perception. One goal of our research is to investigate how local, rapid synthesis of brain estradiol plays a role in auditory processing and mate choice in female frogs. To understand more about the mechanisms of estrogenic neuroendocrine modulation, we first need to know where local estradiol is produced by mapping aromatase, the enzyme that synthesizes estradiol, expression in the brains of reproductively active females. Here, we describe challenges and best practices for visualizing mRNA in uncommon animal species using a method called in-situ hybridization chain reaction (ISH-HCR). We provide helpful resources for molecular studies using HCR and aim to identify candidate brain regions for rapid estradiol synthesis in amphibians. We expect aromatase mRNA distribution to align with estrogen receptor expression and brain regions for auditory processing and social decision-making. Overall, understanding aromatase's pattern of expression in evolutionarily conserved brain regions will provide deeper insight into rapid neuroendocrine mechanisms within vertebrates and improve foundational methods for future work in the process.

R8 Determining the temporal distribution of prions shed in nasal secretions of white-tailed deer inoculated with Nordic CWD

Jessica Gamble, Candace Mathiason, and Erin McNulty

Erin McNulty

College of Agricultural Sciences

Research Poster

Chronic wasting disease (CWD), the prion disease of cervids (deer, elk, moose), was first documented in North America (NA) in the 1970's. The disease was recently identified in Scandinavian cervids (reindeer, red deer, moose). Many studies have been conducted in the

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native host to better understand the pathogenesis and transmission dynamics of NA CWD, with fewer studies conducted to fill these gaps in our understanding about Nordic (NO) CWD. Of particular interest is determining how and when prions are shed from NO CWD-infected cervids throughout disease course. Our previous studies of NA CWD have determined that the infectious agent is shed in saliva, urine, feces and blood, all of which contribute to efficient horizontal transmission of the disease from one cervid to the next. We are currently conducting longitudinal studies in the native host to determine when NO CWD prions are shed in these bodily sections. Here, using the established prion amplification assay Iron Oxide Bead Real-Time-Quaking-Induced conversion we will assess longitudinally collected nasal secretions at 3-month intervals after oral inoculation to determine the shedding profile of prions in nasal secretions. Findings from this study will: (i) enhance our understanding of how NO prions are shed, especially in comparison to NA CWD, and (ii) provide insights about the origin of CWD as we consider whether NO CWD represents an earlier evolution of this disease.

R15 What's in Your Food: Assessing Infectivity in Skeletal Muscle Following Infection of North American and Norwegian Chronic Wasting Disease

Mary Hall

Joseph DeFranco

College of Agricultural Sciences

Research Poster

Deer, elk, moose, and reindeer (cervids) are fundamental aspects of many cultures and lifestyles – such as the consumption of game meat and reindeer husbandry. The prevalence of chronic wasting disease (CWD), a neurodegenerative disease in cervids, has raised concerns among those who consume tissues from these animals. CWD is endemic in North America (NA) and has recently emerged in several European countries, including Norway (NO). NA CWD is highly contagious, in part due to the accumulation of infectivity in peripheral tissues and subsequent shedding, which contaminates the environment. Several research groups have demonstrated CWD infectivity in the muscles of NA cervids. However, there is less known about CWD infectivity in the muscles of diseased Norwegian moose (M-NO) and reindeer (R-NO). Our lab recently developed genetically modified mice that mimic natural CWD infection in cervid hosts, and we developed a highly sensitive protocol to monitor the accumulation of CWD prions in muscle tissues following infection of NA and NO CWD. Consistent with previous findings, further validating our experimental model, we found that mice inoculated with NA CWD harbored high levels of muscle infectivity. Similarly, muscles from R-NO CWD-inoculated mice contained significant levels of accumulation. In contrast, muscles from mice inoculated with M-NO CWD lacked detectable infectivity. Because the zoonotic potential of NA and NO CWD is uncertain,

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these results are significant for humans consuming venison from CWD-infected Norwegian reindeer and further underscore the differences in CWD presentation between cervid species.

C3 Educate, Create, and Connect in Agricultural Literacy

Isabella Hamner

Jennifer Bennett and Kellie Enns

College of Agricultural Sciences

Community Engagement Poster

This internship with CAM's Ag Academy On the Road, a CSU Agriculture Education initiative, focused on expanding agricultural literacy through interactive programming and engagement with Colorado communities. The project aimed to develop, execute, and assess educational activities aligned with CSU Agriculture Education and CSU Spur research while making agricultural topics accessible to diverse audiences. Key contributions included adapting engagement materials into more portable and interactive formats, developing new educational lessons such as "A-Maize-ing Corn Anatomy" and "Beef By-Product Bingo," and designing promotional materials to enhance outreach. These resources were utilized at community fairs, festivals, and CSU-sponsored events, strengthening the program's educational reach. Additionally, I played a role in curriculum development, transforming CAM's lessons into structured formats for future implementation in The Road program. Execution of these activities involved direct engagement with families and students at various events, including the Larimer County Fair, where I facilitated youth competitions and interactive sessions. Conducting agricultural literacy outreach, I assisted in training Junior Ag Ambassadors and leading educational demonstrations. Throughout the internship, I gained valuable experience in structured teaching, communication, and program facilitation. The impact of this internship extended to over 2,880 individuals across eleven Colorado counties, broadening agricultural literacy and fostering community involvement. My experiences deepened my understanding of agricultural education and strengthened my ability to design and implement effective learning strategies. This work has prepared me to be a more effective educator and advocate for agriculture in both formal and informal educational settings.

O1 Investigation into the association between endometriosis and Pituitary pars intermedia dysfunction (PPID) mare

Isabella Hamner

Carleigh Fedorka

College of Agricultural Sciences

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Oral Presentation

Pituitary pars intermedia dysfunction (PPID) is an endocrine disorder associated with elevated adrenocorticotropin hormone (ACTH) and systemic inflammation. It is unknown whether this inflammation affects the reproductive tract. Fibrosis of the endometrium, deemed endometrosis, is often noted in aged mares and is associated with subfertility. This study aimed to evaluate endometrosis in PPID mares, hypothesizing that elevated ACTH and chronic inflammation would increase endometrial fibrosis. Eleven mares were screened for PPID using a thyrotropin-releasing hormone (TRH) stimulation test. Of these, seven mares were found to be PPID positive ($n=7$; ACTH $> 110\text{pg/mL}$), and four were found to be PPID negative ($n=4$; ACTH $< 30\text{ pg/mL}$). Transrectal ultrasonography identified mares in diestrus, and two endometrial biopsies were collected per mare. One biopsy underwent qPCR for inflammatory cytokines, and the other was processed for histology. Statistics were performed on SAS 9.4, and was analyzed with normality and equal variance tests (Bartlett's and Shapiro-Wilks), followed by t-tests for transcript expression (MMP1, MMP2, MMP9, TIMP-2, TNF). Pearson's correlation assessed ACTH and fibrosis marker expression. PPID was not found to affect the expression of any transcript evaluated, and this included MMP2 ($P=0.56$), MMP9 ($P=0.91$), TIMP-2 ($P=0.19$), and TNF ($P=0.35$). There was also no significant correlation between levels of ACTH and expression of fibrotic markers, including MMP2, MMP9, TIMP-2, or TNF. Additionally, there was no significant difference when assessing fibrosis based on histology, as fibrosis was noted in 4/7 PPID animals and 2/4 control animals ($P=0.82$). Thus, PPID does not appear to impact the presence of endometrosis.

R16 Characterizing Herbicide Resistant Weeds in Wheat Production Systems with Drone Hyperspectral Imaging

(space)

Emma Hoopes, Amber Pelon, and Franck Dayan

Phuong Dao

College of Agricultural Sciences

Research Poster

Grassy weeds are a primary competitor for wheat and can contaminate grain. However, herbicides can damage crops and weeds can develop resistance, making herbicide ineffective. This creates the need for weed management strategies that are cost-efficient and effective long-term. Wheat breeding programs have targeted herbicide resistance as a solution to reduce crop damage. When cultivating resistant crop varieties, monitoring for resistance is a critical step. If left untreated, these weeds can produce resistant populations with limited control options. Locating resistant weeds can be costly for large-scale production systems. The rise of agricultural

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remote sensing presents unique insight into crop management. It allows rapid monitoring for disease, nutrient deficiencies, and similar conditions, without requiring significant labor. Remote sensing can identify specific regions in need of inputs, allowing for targeted application and an overall reduction in these inputs. In this study, drone images collected from trial fields planted with wheat and major weeds in wheat systems (jointed goatgrass, downy brome, and rye) were used to characterize herbicide resistance from spectral reflectance. This allows farmers to monitor large fields for resistant weeds. Drone monitoring can also be implemented in breeding programs to screen crops for resistance before it is visually apparent. It is less labor intensive, more objective, and can be conducted earlier in the growing cycle.

O2 Endometrial inflammatory profile of the Pituitary pars intermedia dysfunction (PPID) mare

Jocelyn Howard

Carleigh Fedorka

College of Agricultural Sciences

Oral Presentation

Endometrial inflammatory profile of the Pituitary pars intermedia dysfunction (PPID) mare

Howard, J.1; Hamner, I.1; Crook, R.1; Unger, G.1; Coleman, S.J.1; McCue, P.M.2; Fedorka, C.E.1

1. Department of Animal Sciences, Colorado State University, Fort Collins, CO, USA

2. Department of Clinical Sciences, Colorado State University, Fort Collins, CO, USA

Pituitary pars intermedia dysfunction (PPID) is an endocrine disorder associated with elevated adrenocorticotropin hormone (ACTH). PPID animals have elevated systemic inflammation, and specifically an upregulation of the pro-inflammatory cytokine interleukin-8 (IL-8). It is unknown if this inflammation is noted with the reproductive tract. We hypothesize that elevated ACTH will lead to an increase in IL-8 expression in the endometrium, therefore predisposing mares to endometritis. Mares were screened for PPID using a thyrotropin-releasing hormone (TRH) stimulation test. Of these, seven mares were determined to be PPID positive (n=7; ACTH>110pg/mL), and four were determined to be PPID negative (n=4; ACTH<30 pg/mL). When in diestrus, an endometrial biopsy was obtained from all mares for qPCR analysis of select inflammatory cytokines. The impact of PPID on cytokine expression was evaluated using an unequal variances t-test. Correlation between ACTH and cytokine expression was assessed using a Pearson's correlation. Significance was set to P<0.05. Of the cytokines evaluated, only IL-8 was found to increase in expression in the PPID population (P=0.02). There was a positive correlation between ACTH post-TRH stimulation and the endometrial expression of IL-8 (P<0.001; R²=0.80). A weak but positive correlation was also noted between ACTH and endometrial expression of IL-6 (P=0.04; R²=0.41) and IFN γ (P<0.01; R²=0.63). In conclusion, the systemic inflammation noted

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in the PPID animal is also observed within the endometrium. This increase in IL-8 may be associated with increased neutrophilia, which would be detrimental to the fertility of mares.

R17 Characterization of Beet Curly Top Virus Strains and Their Transmission Dynamics in Hemp in Colorado

Raiyaa Huntress, Jacob MacWilliams, Jinlong Han, and Max Schmidtbauer

Punya Nachappa

College of Agricultural Sciences

Research Poster

After a nearly fifty-year hiatus, the 2018 United States farm bill reintroduced industrial hemp (*Cannabis sativa* L.) back into the agricultural landscape. Colorado's dry climate and high altitude create optimal growing conditions, in part due to a reduced prevalence of diseases common in more precipitous regions. Instead, the West faces challenges from various viral diseases, including beet curly top virus (BCTV). BCTV is thought to be exclusively transmitted by the beet leafhopper (*Circulifer tenellus*) and has recently been identified as infectious to hemp. While infection in hemp leads to overall plant decline and a potential decrease in biomass yield, further research is required to fully understand the epidemiology and impact on plant health. Therefore, the goal of this research is to characterize BCTV strains and vector dynamics, as well as to determine if BCTV can be transmitted in seed. We hypothesize that in field grown hemp, there will be a variety of BCTV strains present and BCTV transmission rates will positively correlate with increased beet leafhopper populations. We also hypothesize that despite previous literature, BCTV is seed transmissible in hemp. Our results reveal that four strains of BCTV were detected in field grown hemp, and that BCTV transmission increases after mass beet leafhopper influx. Our results also illustrate that beet curly top virus is seed transmissible in hemp, but the exact mechanism is still to be determined. Understanding strain diversity, vector dynamics, and modes of transmission is crucial for guiding future research decisions and these findings highlight the need for continued investigation of BCTV in hemp.

R11 Exploration of the role of flavonoids on pest resistance in *Cannabis sativa*

Susannah Huston

Jacob MacWilliams

College of Agricultural Sciences

Research Poster

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Hemp (*Cannabis sativa*) is a growing industry in the United States with a wide variety of uses from fiber to its numerous secondary metabolites produced including cannabidiol (CBD). While lesser known than cannabinoids, one group of secondary metabolites that are highly produced in hemp that are underutilized is flavonoids. Flavonoids have diverse structures and functions, including detrimental impacts on insect pests. Here we investigated the role of flavonoids in plant defense against one of the most damaging pests of hemp, the cannabis aphid (*Phorodon cannabis*). Aphid population screening on hemp cultivars that varied in flavonoid concentrations identified significantly more aphids when flavonoids were not present. One flavonoid in particular was identified, orientin, through these screens and supplemented in artificial feeding assays. The supplementation of orientin led to significant decreases in fecundity at both 1 mM and 5 mM. The negative impacts observed by flavonoids, specifically orientin, on cannabis aphid indicate flavonoids have a role in plant defense to cannabis aphids. Future research focusing on the defense potential of flavonoids to hemp pests should be investigated for crop improvement and breeding.

R21 Invasive Carp: Taking Over The Mississippi

Andrew Johnson

Veronica Yovovich

College of Agricultural Sciences

Research Poster

Asian Carp (*Hypophthalmichthys* spp.) have become one of the most pressing ecological threats in the Mississippi River and Great Lakes region. Introduced in the 1970s to control algae in aquaculture facilities, these invasive fish have since proliferated, outcompeting native species for food and habitat. Their rapid expansion has led to significant declines in native fish populations, disrupting commercial and recreational fishing industries. This competition not only threatens biodiversity but also creates economic hardships for fisheries reliant on native species like walleye and perch. Beyond ecological and economic concerns, the Asian Carp invasion has sparked social conflicts among stakeholders, including commercial fishers, conservationists, policymakers, and recreational users of the waterways. Habitat degradation caused by the carp—through increased turbidity and disruption of aquatic food webs—has fueled debates on management strategies, ranging from physical barriers to commercial harvesting initiatives. While some advocate for large-scale population control methods, others worry about unintended consequences on native species and waterway accessibility. This poster will explore the ecological consequences of Asian Carp proliferation, its economic toll on commercial fishing, and the stakeholder conflicts surrounding mitigation efforts. Using case studies from the Mississippi River Basin and Great Lakes region, it will highlight current management approaches

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and potential solutions. Understanding this human-wildlife conflict is essential for developing sustainable policies that balance ecological integrity with economic viability.

R10 The Surveillance of Livestock and Rodents for Coronaviruses on the Navajo Nation

Shekinah Johnson, Christie Mayo, Laura Pulscher, Phillida Charley, Talia Byrne-Haber, and William Schountz

Gilbert John

College of Agricultural Sciences

Research Poster

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) outbreak in 2019 has raised numerous concerns for the livestock industry. A prevalent worry was whether the virus was present in livestock and wildlife, potentially acting as reservoirs and transmission vectors between species. Although the disease outbreak is quite recent, researchers and scientists are gathering more data on the presence of the virus in animals. Our project focuses on a surveillance effort to test livestock and rodents within the Navajo Nation, an area that has received limited attention due to its rural location. In collaboration with the Sweetwater (AZ) Chapter and the Navajo Nation Wolf Springs Ranch (CO), we tested the presence of SARS-CoV-2 in livestock and rodents. From January 2024 to present, we have collected blood samples, oral swabs, and rectal swabs from the livestock and rodents. Samples were tested by qRT-PCR then confirmed with gel electrophoresis. Suspect positive samples were further confirmed by a pan-coronavirus conventional semi-nested RT-PCR. Following this process, no livestock were found to have active SARS-CoV-2 infections. However, rodents yielded one positive beta-coronavirus. These results suggest that livestock were not actively infected with SARS-CoV-2 but may have been previously infected with SARS-CoV-2, or a cross-reactive virus.

R14 Effects of Inhalation of Agriculture Dust on Mice Behavior

Nathan Klepper

Julie Moreno

College of Agricultural Sciences

Research Poster

It's known that agricultural dust causes inflammation in the lungs and brain. We hypothesised that this would lead to behavioral changes irrespective of the route in inhalation, internasal (IN) or oropharyngeal (OP). The study focuses on the behavioral and physiological effects of IN vs.

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OP inhalation of agriculture dust. Over 8 weeks, 60 mice were split into four groups: IN saline, IN dust, OP saline, and OP dust. Behavioral data was collected every other week using an open-field test and analyzed using AnyMaze software. Results show a significant decrease in central movement in female mice treated with dust OP compared to dust IN females. Also, dust OP females spent more time immobile near the edge than the IN females. This behavioral change indicates that OP dust females experience increased anxiety. There is no significant change between dust males. This signifies behavioral differences between IN and OP dust inhalation in females and that dust inhalation affects males and females differently. The study indicates that more research needs to be done to fully understand the role of the brain and the induced systemic inflammation caused by the inhalation of agricultural dust.

R2 Exploring brain signals: neural excitability in the posterior hypothalamus of male and female rats

Kamalani Larson

Brent Myers and Courtney Bouchet

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Research Poster

Cardiovascular diseases are the leading cause of death globally and are intensified by stress; however, the neurobiology linking stress and cardiovascular diseases is not well understood. Previous work in our lab indicates that neurons within a brain region called the posterior hypothalamus (PH) are sensitive to stress and can regulate cardiovascular function, such as blood pressure and heart rate. However, the characteristics of the neurons within the PH are not well understood and could be important in the differential susceptibility to stress-induced cardiovascular diseases. Therefore, the goal of this project is to investigate action potential firing properties of neurons within the PH. Male and female GAD-Cre transgenic Long-Evans rats received injections of a virus leading to red fluorescence in inhibitory, GABAergic neurons and green fluorescence in excitatory, glutamatergic neurons. Cellular properties were investigated using patch clamp electrophysiology, a method that measures electrical properties of neurons. Electrical current from -100 to +100 pA was injected into neurons to measure excitability and the presence of hyperpolarization-activated channels. These data indicate that neuronal excitability is not dependent on sex or cell-type. However, sag, a measure of hyperpolarization-activated channels, is dependent on both cell-type and sex, with female inhibitory cells exhibiting larger sag than all other groups. This project provides a deeper understanding of the properties of excitatory and inhibitory neurons in the PH and how they could play a role in stress-related diseases. This work was supported by NIH R01-173525 awarded to Dr. Brent Myers and NIH F32-HL172693 to Dr. Courtney Bouchet.

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R9 Deciphering the role of transcriptional regulatory elements to enhance stress responses in rice

Ellie Misra-Matson

Federico Martin

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Research Poster

Rising global temperatures and erratic weather patterns drive ecosystem changes allowing plant pathogens to spread and thrive in new niches further stressing agricultural systems. Efforts to contain the spread of plant diseases often rely on the use of agrichemicals. A more sustainable alternative is to enhance natural plant resistance to pathogens and pests. Though, this is a complex and lengthy process that can take up to 10 years. Tolerance in crop plants to stresses involves changes in expression patterns of numerous genes. These changes are controlled by short sequences in promoter areas, specifically cis-regulatory elements (CRE) or assemblies of CRE organized as modules (cis-regulatory modules or CRM). Increasing evidence shows that conserved CRE and CRM are found in promoters of many genes that are co-activated by a single stress, and that they are common to genes co-activated in plants with enhanced tolerance to different stresses. We hypothesize that conserved CRE/CRM enable coordinated gene activation, contributing to enhanced defense responses. Previous work in our group identified multiple genes involved in defense responses including phenylalanine ammonia lyase (PAL), oxalate oxidase (OXO) and germin-like proteins (GLP) which share similar CRMs in the proximal promoter regions. Using CRISPR-cas genome editing technology, we have targeted and modified some of these CRMs in a multiplex approach. Currently, we are genotyping targeted regions to identified beneficial modifications and selecting specific lines for future studies. Edited lines will be tested with different pathogens to analyze their susceptibility response. Our goal is to better understand the role that specific CRMs have in gene activation during defense responses and use them to guide genetic selection of the most active allele for efficient development of climate-ready varieties.

C1 Horticulture Educational Programming for Colorado State University Trial Gardens and Heritage Arboretum

Max Nikkari

Chad Miller and Daniel Burcham

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Community Engagement Poster

The Colorado State University Annual Trial Gardens and Heritage Arboretum are just two examples of horticulture sites that work to meet the extension and education goals expressed by Colorado State University and the Department of Horticulture and Landscape Architecture. In an effort to increase the educational programming of both sites, identify potential programmatic unity, and gauge public interest in educational attendance and cost, two public surveys were written and released in the summer of 2024. A survey was designed for each site and signs with a QR access code were posted along paths and planting beds of the Annual Trial Garden and Arboretum from June through September, 2024. 51 responses were collected in the Arboretum. 128 responses were collected in the Annual Trial Garden. Survey results indicated a desire for increased active and passive programming in both sites. 70% of respondents in the Arboretum and 56% of respondents in the Annual Trial Garden indicated a willingness to attend events. 50% of respondents in both sites indicated a willingness to pay to attend educational programming. Popular programming choices included native plant education, plant identification, best planting practices, and birding. Survey responses will be used to select, schedule, and accordingly price future programming in both sites.

R7 Climate change adaptation in urban forestry: Cold hardiness tests for novel tree species in Colorado landscapes

Max Nikkari

Daniel Burcham

College of Agricultural Sciences

Research Poster

Towns in the American West are often marked by high tree density compared to the surrounding landscape. This difference is attributed to people's long and storied affinity for trees and a recognition of their ability to improve people's lives. Nearly all of the trees planted and growing in Colorado towns are not native to our state or the wider Intermountain West, and many share concerns about the fitness of existing trees for future conditions in a continuously changing climate. As the need for drought and heat tolerant trees increases, it remains important to consider the frequent temperature fluctuations Colorado experiences and the cold snaps they induce. Warming temperatures may moderate severe freezes, but they will continue, and cold hardiness will be an important characteristic in the evaluation of novel and hardy trees. From November 2024 through May 2025, fourteen genotypes of five tree species (*Quercus gambelii*, *Hesperocyparis arizonica*, *Taxodium distichum*, *Picea pungens*, and *Cercis canadensis*) were evaluated for cold hardiness using electrolyte leakage. One and two year tissue was harvested

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from each genotype and underwent a multi-step freezing protocol. Following the freezing sequence, samples were submerged in liquid nitrogen to induce maximum damage. Electrical conductivity (EC) data was collected post freezing and post liquid nitrogen to quantify freeze-induced cell leakage. EC data was processed to establish LT50 values that represent the theoretical cold hardiness for each genotype and may be used in evaluation and recommendation of novel trees for Colorado's future growing environment.

R4 Evaluating Irrigation Rates for Ornamental Plants in Containers

Ashlyn Schall

Chad Miller

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Research Poster

I assisted in an irrigation trial over the summer of 2024 at the CSU trial gardens to better determine the water needs of ornamental plants in containers. My trial consisted of 15 replications of petunias, each given one of three irrigation treatments: 2gal/hr. (control), 1gal/hr., or 0.5 gal/hr. Data in the form of photographs were taken weekly as well as fresh and oven-dried biomass measurements after harvest. This study may contribute to future changes in water use at the CSU Trial Gardens.

R19 GBA1 and GBA2: The Final Pieces of Evidence

Ryan Thompson, Kaitlyn Dirks, Samantha Pinto, and Suad Elmegerhi

Rushika Perera

College of Agricultural Sciences

Research Poster

Mosquito borne illnesses present a global threat to all communities, and one of the most prolific and dangerous of these is dengue fever. With no effective vaccine or drug treatments currently available it is critical to develop countermeasures against dengue viruses. Flaviviruses have the insidious ability to harness normal metabolic functions at the great detriment of host cells, for the purpose of viral replication. Our research seeks to establish a link between dengue viral titer and the function of beta-glucocerebrosidases, GBA1 and GBA2. Preliminary results from siRNA screening showed that there is a significant link between enzyme function and viral titer. Drug testing has revealed that the agent Ambroxol Hydrochloride results in a seven-fold decrease in viral titer and continues to decrease viral titer even at high concentrations (12mM), without a

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deleterious effect on cell viability. This is critical because it strongly indicates that FDA approved drugs acting as GBA1 chaperones may be vital in suppressing viral load in infected patients, establishing the first antiviral drug treatment for dengue Fever. Using a CRISPR/Cas9 knockout technique with a lentiviral transfection vector we generated a transgenic cell-line of Human Adenocarcinoma Lung cells (A549), to study the role that the GBA1 and GBA2 genes play in the dengue viral life cycle. We believe that this knockout will result in an increased viral titer, proving that these genes are antiviral. These results will be presented.

R12 Interference of Potato Virus Y Transmission by Aphids Using Small Peptide Inhibitors

Josie Weese and Vamsi Nalam

Jinlong Han

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Research Poster

Disease caused by Potato virus Y (PVY) is the major yield-limiting factor in potato production. PVY is naturally transmitted between plants by aphid vectors. Control of in-season PVY spread relies heavily on insecticides to suppress the vector populations. However, due to the competence of aphids to transmit PVY within seconds before being killed by chemicals, insecticides are generally inefficient in controlling PVY spread. To block the virus transmission by aphids, we developed small synthetic peptides as antiviral molecules to compete against the virus-binding site in the aphid stylet. The outcome of this work will help reduce the spread of PVY by aphids, while restoring the health of the ecosystem by lowering the use or need of environmentally harmful insecticides. As PVY also causes damage to other agronomically important crops, the end product of our study will help protect not only the potato industries, but also other susceptible crops across the states. Currently in this project we are testing different delivery methods of the peptide to see how it can be most effectively applied in the field.

R20 Sustainable Nitrogen Management: Investigating Chemical Solutions for Feedlot Emissions

Catie Wharton

Sara Place

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Research Poster

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This study investigates the impact of two distinct cattle diets and chemical amendments on nitrogen excretion in a feedlot setting. Two pens (n = 45 hd/pen) of cattle were fed diets varying in urea content: one with 0.76% urea and 2.37% nitrogen (N) on a dry matter basis (DMB), and the other with 0.13% urea and 1.84% N DMB. Feedlot surface material (FSM) samples were collected on days 0 and 28, with 12 random samples per pen. Samples were dried and analyzed for pH, total carbon (C), total N, and C:N ratio. On day 28, FSM from each pen was combined, divided into 18 tins (9/pen), and treated with 10 mL of: control (DI water), NaF (10mM NaF), or TA:NaF (5mM:1mM tannic acid: sodium fluoride). After a 16-day incubation period, samples were analyzed. While the diet significantly influences the total C and N content, chemical amendments did not yield statistically significant effects. Differences in pH, %N, %C, and C:N were observed between treatments and diets, though none were statistically significant. The findings suggest that the two-week amendment period may have been insufficient for a clear dosage response, and the chemical concentrations may have been too low to produce the intended effects. Additionally, the uncertainty in FSM sampling time could have impacted results due to potential nitrogen volatilization before collection. Future research should collect fresh fecal samples directly from animals to minimize such variability.

R6 Enhancing Branching Structure in Ornamental Plants with Algae-Based Biostimulants

Rebekah Zobel

Chad Miller

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Research Poster

This study evaluated the efficacy of Expressseed's algae-derived biostimulant, named "Control", in promoting increased, favorable branching in ornamental horticultural crops in a greenhouse setting. Four treatments were observed—weekly and bi-weekly applications of "Control", a competitor's product (B9+ Florel), and a untreated group—were applied to three crop species. Results showed no significant effect on branching structure across the treatments, suggesting the biostimulant did not outperform the competitor or the untreated in this context.

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R27 AI and Workplace Inclusion

Gavin Gumpf

Tiffany Trzebiatowski

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Research Poster

Creating an inclusive and equitable workplace where employees feel accepted, understood, and connected remains a critical challenge for organizations. While workplace initiatives aim to foster allyship and bridge social divides, they often face barriers such as social identity threats, uncertainty, and resistance to perspective-taking. This study employs a field experiment to examine whether AI-driven chatbots can reduce these barriers and foster meaningful engagement in workplace interactions. Specifically, we investigate how deep vs. surface-level identity interventions, facilitated by AI, impact employees' perceptions of learning, psychological safety, and engagement with allyship behaviors. Our findings will provide insights into AI's role in promoting constructive workplace interactions and influencing organizational allyship efforts, equipping organizations with strategies to foster collaboration and inclusivity across differences.

R25 How Challenging Is It to Implement Sustainability and DEI Strategies? The Small Apparel Business Perspectives

Kara Koniares

Ruoh-Nan Yan

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Research Poster

While there have been many studies examining sustainability and diversity, equity, and inclusion (DEI) in varying contexts, little research is focused on how small businesses practice both of these initiatives, particularly in the apparel industry, which is one of the most impactful industries in terms of environmental and social issues. Small businesses were selected as the focus of this study due to their significant presence and economic impact in the United States. Recent data indicates that there are approximately 34 million small businesses nationwide, accounting for 99.9% of all firms. The purpose of this research was to explore how small apparel businesses implement sustainability and DEI practices and why or why not they chose to do so. The two primary research questions we developed for the study were: RQ1: How do small businesses in the apparel industry implement sustainability and DEI strategies? RQ2: What are factors that

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might influence their decisions when deciding whether and how to practice sustainability and DEI?

R24 Do Managers and/or Investors Benefit from Spin-offs? Analyzing the Reasons Behind and Implications of Corporate Spin-offs

Alex Munsie

Robert Schonlau

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Research Poster

This research project, titled "Do Managers and/or Investors Benefit from Spin-offs? Analyzing the Reasons Behind and Implications of Corporate Spin-offs," investigates the motivations behind corporate spin-offs and their impact on investors. A spin-off involves separating a portion of a firm's assets and operations into a new, independent company, owned by the same shareholders as the parent firm. Thousands of spin-offs have occurred in recent decades, involving billions of dollars in assets, impacting millions of investors. The primary rationales that exist in the academic literature for spin-offs focus on the division's potential to thrive independently and the belief that the firm's overall value is less than the sum of its parts. This study documents the reasons provided by managers through SEC filings and news stories and examines whether these reasons align with the organizational structure and financial performance of the spun-off entities. Said reasons are then documented within a spreadsheet along with other empirical data relating to the implications of corporate spin-offs. The paper provides a comprehensive look at the modern spin-off market, revisits early findings by Ahn and Walker (2007) and others, and investigates new agency issues that may exist around spin-off events. Key tables will include data on spin-offs by year, board characteristics, firm comparisons, relative valuations, reasons for spin-offs, and changes in CEO and director compensation in order to explain the financial performance of said spun-off companies.

R26 Evaluating the Financial Impact of Worker Compensation Changes on Firm Value

Harika Shankar

Samantha Conroy and Zachary Rogers

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Research Poster

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Pay practices play a crucial role in shaping organizational success and significantly impact worker well-being. The Understanding the Pay-off of Good Pay Practices study examines whether pay-related announcements for non-executive workers lead to abnormal stock returns, assessing the financial consequences for compensation decisions. Our research team analyzes data from publicly traded companies (2000-2023) to assess market reactions to announcements of changes in wage policies. Additionally, this study integrates a supply chain perspective, evaluating how pay announcements affect supplier stock performance. Using a consolidated dataset, our analysis aims to identify patterns in market reactions to pay changes, offering valuable insights for industry leaders. This research enhances discussions on compensation strategies, equipping organizations with data-driven perspectives on the financial implications of wage policies.

V1 Evergreen, New York Kid

Ameir Taylor

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Visual Art

It had been a long time since I walked around with a camera strapped around my neck. My friend Gerald Bryce Bellamy, much preferred to be known as G.B., the subject of this collection, insisted I do it again in New York City. So, we started in Manhattan and ventured about for three days. Of all the things I inquired about the city, I most remember asking “Do you see yourself living in New York for the rest of your life?”, and with pitying eyes, looking to ensure he was the one I was asking such a question to, he said politely, “Yeah. This is my city.” For the next seventy-two hours, I watched a younger brother interact intimately with his city. Not only did he know what great distances held without a map, but he also knew how to interact with certain people, in which city, in what manner. I learned something major about NYC through G.B. Although it is a jam-packed city, with so much to say and much to do, it houses individuals living in their little corners, constantly looking for someone to reach out to. And that is what I captured in these three photographs – a boy constantly looking deep into my lens longing to be captured, wanting to be seen, wanting connection. I call him the quintessential Evergreen, New York Kid.

W1 Rebuilding Harmony: The Struggle Between Men and Women in Modern Society

Ameir Taylor

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Written Work

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The greatest challenge in today's society is the growing divide between men and women, which has created misunderstandings and friction in both personal and public spheres. This issue, amplified by shifting societal norms and digital platforms, hinders effective communication and collaboration between the sexes. Drawing on ancient philosophical ideas of balance, the essay explores how gender roles are evolving and how this disruption has led to increased tensions. Despite these challenges, the essay suggests that through deeper, more personal connections and a shift away from digital interaction, men and women can bridge this divide. Ultimately, the essay argues for the importance of unity and cooperation in overcoming societal discord, proposing that, like a grafted tree, individuals can grow stronger together by embracing their differences.

R28 Gender Dynamics in the Loan Application Process: A Role-Playing Study

Edith Valenzuela

Xiaoxu Wu

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Research Poster

This study explores the dynamics of the loan application process through a role-playing experiment involving students acting as both loan officers and customers. The objective was to examine potential gender differences in interactions during loan consultations, focusing on the information exchanged and the perceived support provided by loan officers. Participants, drawn from different classes, were assigned roles and subsequently engaged in structured surveys to assess their experiences. The data collection involved pre- and post-experiment surveys, where participants responded to questions regarding the content of discussions and the satisfaction levels with the information received. Additionally, a treatment approach was employed, wherein some loan officers were intentionally provided with less information than others, allowing for comparison of outcomes based on the level of guidance offered. Preliminary findings suggest variances in how male and female customers perceive the information provided by loan officers and how much they feel supported throughout the loan application process. The emphasis on gender dynamics sheds light on potential biases and areas for improvement in customer service strategies within the lending industry. Ultimately, this research highlights the importance of understanding the nuances of borrower interactions to foster equitable loan processes and create tailored educational interventions that can enhance the experience for all applicants, regardless of gender. Future studies will delve deeper into these findings, aiming to offer actionable insights for industry practitioners.

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R22 Understanding the Motives Behind Cyberloafing in the Workplace

Jackson Wall

Christine Henle

College of Business

Research Poster

In the digital age, technology is deeply integrated into the workplace, enabling productivity and many non-work-related activities. This study explores cyberloafing—the act of using technology for personal purposes during work hours. Examples include posting on social media, shopping, communicating with friends outside of work, and downloading files. While often viewed negatively through the lens of decreased productivity and distraction, cyberloafing has been shown to have some positive effects on employees such as relaxation, reduced stress, and a sense that they can take a brief break from their work. Through qualitative research, we investigate why employees engage in cyberloafing, which might include coping with high or low work demands, maintaining social connections, and balancing personal responsibilities. Our findings aim to provide a comprehensive understanding of this behavior, shedding light on its potential causes and motivations. By identifying key motives, we contribute to discussions on workplace policies and employee well-being, offering insights into how organizations can navigate the balance between technology use, productivity, and job satisfaction.

R217 The Parable of the Raft: The Uniqueness of Study Abroad Relationships

London Weiss-Darne

Stephanie Moreira

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Research Poster

Approximately 1,600 CSU students study abroad each year (CSU Education Abroad), but the opportunity to reflect on the significance of the relationships created during these experiences may be limited. The aim of this study is to better understand why relationships and connections students make while abroad seem richer, deeper, and more vulnerable, often in an accelerated fashion. Using a constructivist mixed methods approach, three participants shared how they made meaning out of their study abroad experience. Participants expressed their answer to the research question in a creative format of their choosing. Findings suggest a strong relationship between cultivating deep relationships while abroad, as well developing a profound understanding of self. These findings suggest that being abroad provides a unique environment

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for deeper relationships and connections. Universities, students, and special programs can leverage this knowledge to create more opportunities for meaningful relationships.

R23 The Role of Financial Literacy, Self-Efficacy, and AI Anthropomorphism in AI-Driven Financial Decision-Making.

Gigi Young

Nandini Nim

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Research Poster

As artificial intelligence (AI) becomes increasingly integrated into financial decision-making, consumer trust remains a critical factor in adoption. This study examines how self-efficacy, financial literacy and AI anthropomorphism influence trust in AI-driven financial advisors. While prior research highlights skepticism toward AI's decision-making capabilities, some consumers still rely on algorithmic financial tools. We propose that lower trust in AI can reduce self-efficacy, leading to greater dependence on AI advisors. Additionally, financial literacy is expected to strengthen trust in AI, reinforcing self-efficacy and confidence in AI-generated financial recommendations. In contrast, AI anthropomorphism may introduce perceptions of fallibility, weakening trust and affecting consumer willingness to adopt AI-based financial tools. Using a mixed-method approach—including literature reviews, secondary data, consumer surveys, and laboratory experiments—we explore these dynamics to identify trust-building mechanisms. Our findings aim to inform AI design strategies that enhance consumer confidence, mitigate decision-making biases, and promote effective engagement with AI financial tools, ultimately leading to improved financial outcomes.

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R49 Generational Differences in Consumer Attitudes Toward Sustainable Fashion

Emily Asp and Alexander Wood

Ruoh-Nan Yan

College of Health and Human Sciences

Research Poster

The purpose of this study is to understand clothing purchase decision-making processes. Our research team aimed to answer the question: “Are there generational differences in consumers’ attitudes toward sustainable fashion and related affective responses?”. Generational cohorts, including GenZ (born 1997-2012, 12-27 yrs old), GenY or “Millennials” (born 1981-1996, 28-43 yrs old), and GenX (born 1965-1980, 44-59 yrs old), exhibit unique traits shaped by their environments, experiences, and values. Existing studies suggest shoppers are increasingly interested in the environmental impact of their apparel purchases, though this trend is more common among younger generations (GenZ and GenY). Increasing awareness among slow-adopters is vital for sustainability in fashion, making it crucial for retailers to understand each generation to avoid information overload (McNeill & Moore, 2015). We used convenience sampling for four focus groups: 1 trial run (4 people) and 3 generational groups (5 GenZ, 4 GenY, and 5 GenX). The trial and GenZ groups were held on CSU campus, while GenY and GenX groups were online via Microsoft Teams for accessibility. Co-moderators asked open-ended questions about participants' clothing purchase perceptions and experiences. We then analyzed session notes, video/audio recordings, and transcripts to identify data trends (in-progress). This research can help apparel brands cater sustainable products to various demographics, reducing textile waste and environmental degradation caused by traditional fashion.

R32 Remote Deployment Of a Smartphone-Based Sit-to-Stand Power Test

Caroline Bauer

Brian Tracy

College of Health and Human Sciences

Research Poster

The 5x sit-to-stand (STS) is a common measure of physical function. The typical outcome is simply total time. However, common smartphone sensors may provide more detailed information on movement speed and power of the rising phase of STS. In a large study (N = 240, 21-70 yrs) of chronic pain patients, smartphone-instrumented STS tests were performed in a

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remote van lab. The smartphone was attached to the lateral thigh and for each STS the peak rotation rate and rise time was measured during the rising phase with the onboard gyroscope sensors. The total 5xSTS time was also measured from movement data. Measures were performed both in the lab building (baseline, BL) and ~1wk later in the van. At BL: the sum of the rise times was 40% of the total 5xSTS time. Across the age range, STS power declined by 0.31 rads/s*kg per year. STS power was weakly negatively correlated with total 5xSTS time ($R^2=0.28$). Avg peak power of 5 reps was tightly correlated with Avg peak power of the single max rep ($R^2=0.99$). From BL to Pre: Total 5xSTS time and rise time measures decreased very slightly ($P < 0.05$) but rotation rate values did not change. Quantitative smartphone-based measures of STS power are feasible in a remote vehicular lab, and are comparable to outcomes measured in a typical lab. These actual power measures are weakly correlated with the traditional timed outcome, therefore this instrumented test is a better measure of chair rising, which is functionally limiting.

O5 Research-Informed Healthcare Design: A User-Centered Approach to Designing a Stroke Rehabilitation Center

Elizabeth Beall and Colleen Hanley

Jain Kwon

College of Health and Human Sciences

Oral Presentation

This research-based project focuses on designing a healthcare facility tailored to stroke patients. The STRATA Stroke and Rehabilitation Center emphasizes a holistic approach to care, addressing the physical, psychological, and social aspects of recovery. Many current stroke rehabilitation facilities lack adequate long-term care and fail to address the emotional and mental needs of patients and families, in addition to disparities in care, particularly for minority communities. Inspired by Colorado's natural landscapes, the design creates calming, layered spaces that promote relaxation and healing. The facility is intentionally designed to be welcoming and the materiality and color palette creates an environment that reduces stress, supports cognitive function, and enhances overall well-being. The design also explores how effective wayfinding and access to nature positively influence recovery and well-being. The design integrates the universal design principles to ensure accessibility and independence. Dedicated spaces for community engagement and education foster social connection, support, and rehabilitation and education systems preventing future strokes. By addressing both physical and emotional recovery through thoughtful design, this project contributes to a more inclusive and effective approach to stroke rehabilitation.

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R35 Effects of Dabbing Cannabis Concentrate on Multidirectional Postural Control

Kai Brown

Brian Tracy

College of Health and Human Sciences

Research Poster

A popular means of ingesting cannabis is dabbing concentrated product. Accurate, portable assessment is key to understanding the physical effects on motor control. The purpose was to examine the acute effects of dabbing on multidirectional balance using the smartphone as a movement sensor. Thirteen volunteers (22-44yrs) were studied during a cannabis industry event. Balance (eyes closed and open) was measured before and after cannabis dabbing (1-8 dabs). The accelerometer in an iPod Touch was used to record the standard deviation of anterior-posterior (AP) and medial-lateral (ML) sway. Number of dabs and subjective intoxication was recorded. After cannabis consumption there was no change in eyes open sway for AP or ML directions. However, eyes closed sway was 41% impaired, with a 63% change for AP that was greater than ($P=0.02$) the 24% change for ML direction. There was no correlation between balance impairment and number of dabs. Change in EO and EC sway was weakly correlated with subjective intoxication (both $P=0.08$). The results indicate that proprioceptive function is impaired after concentrated cannabis use. Without visual feedback, balance is more impaired with cannabis. This suggests a negative effect on the quality of or processing of proprioceptive information. The sensors in smartphones are capable of measuring subtle changes in postural control and may be useful in remote settings such as roadside intoxication assessment.

R53 Experiential student lab project: Measures of the electromyogram during eccentric and concentric contractions

Lauren Brunell

College of Health and Human Sciences

Research Poster

The differences in neural control of shortening (CON) versus lengthening (ECC) muscle contractions is a fundamental concept in neuromuscular physiology. For equivalent loads, reduced neural drive to the muscle (electromyogram, EMG) during ECC is classically observed, due to the inherently greater force production capability in ECC. Here we describe EMG of CON and ECC contractions measured with an expensive lab system (ADInstruments, ADI) and an

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inexpensive education-grade EMG system (Backyard Brains, BYB), to provide a teaching method that is accessible to more institutions. During an in-class teaching development exercise, two students lifted and lowered a weight 5-7 times (40-50% max) using 3s lifting and lowering phases, while the EMG of the biceps brachii was concurrently measured with the lab-grade and education-grade device. Electrodes serving each system were placed immediately adjacent to each other. The root mean square (RMS) of the EMG signal was measured from both systems in the middle of the CON and ECC phase. EMG during ECC was 81% of CON for ADI and 77% for BYB. For CON and ECC pooled, EMG values from the two devices were positively correlated ($R^2 = 0.58$). The findings show that an education-grade EMG device is suitably sensitive to quantify neural activation during CON and ECC in a teaching lab setting. This equipment could increase access to instructors and students at institutions with varying instructional resources.

R34 Surgical Nerve Decompression and Lower Limb Motor Function in Peripheral Neuropathy

Jaden Diaz

Brian Tracy

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Research Poster

Lower limb motor function such as muscle strength, contraction speed, and ambulation is impaired in those with peripheral neuropathy. The purpose was to examine the effect of surgical nerve decompression surgery on ankle muscle function in peripheral neuropathy. Ankle muscle function tests (dorsiflexors, plantarflexors, DF, PF) were conducted on 14 patients (65.6 +/- 9.61 yrs) before and six weeks after surgery to release nerve pressure at entrapment points. Strength (max voluntary force, MVC), contraction speed (rate of force development, RFD), and ambulation speed (timed up and go, TUG) were measured. Overall, MVC force and RFD showed no significant changes in DF or PF. However, significant negative correlations ($p < 0.05$) between pre-surgery MVC and the change in MVC after surgery for the DF ($R^2 = 0.46$), but not for PF ($R^2 = 0.11$). Similar negative correlations between the pre-surgery 100 ms RFD and change in RFD after surgery for DF ($R^2 = 0.41$) and PF ($R^2 = 0.58$), and between the pre-surgery 200ms RFD and the change in RFD after surgery for DF ($R^2 = 0.55$) and PF ($R^2 = 0.50$). TUG performance increased by 8.8% ($p = 0.016$), with slightly greater improvement in those most impaired ($R^2 = 0.20$, $P = 0.057$). Lower limb nerve decompression surgery did not produce consistent increases in strength, speed, but slightly improved ambulation. However, the results suggest that those with lower function experienced greater improvement.

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C6 Empowering Refugee Students: Building a Supportive Network at CSU

Salma Douah

Samrawit Desta

College of Health and Human Sciences

Community Engagement Poster

Refugees are strong and brave individuals who are forced to flee their home countries due to persecution, war, or violence. Upon arriving in a new country, refugee students face numerous challenges when transitioning into higher education systems, including academic gaps, language barriers, and a lack of support networks (UNHCR US). These difficulties often lead to lower retention rates and emotional struggles, which hinder their academic success and social integration. This project aims to address these challenges by providing a robust support system that fosters both academic achievement and emotional well-being. The initiative is important because it has the potential to create a more inclusive campus environment at CSU, benefiting marginalized populations and enhancing the overall diversity of the university community. To achieve this, the project will implement several key strategies, including a peer mentoring program where upperclassmen or community members assist refugee students with academic and social integration. Cultural sensitivity workshops will also be provided to increase awareness and understanding, alongside a centralized resource hub connecting students to essential services such as housing, mental health support, and academic resources. Although still in its early stages, the expected outcomes include the establishment of a supportive network that bridges academic gaps and addresses mental health challenges while considering the unique circumstances of refugee students. This project's goal is to improve the academic, social, and emotional integration of refugee students at CSU. If successful, it will serve as a model for other universities seeking to support marginalized student populations and create a more inclusive academic environment.

C7 The housing insecurity crisis amongst independent and international students

Jazmyne Ewing

College of Health and Human Sciences

Community Engagement Poster

Housing insecurity is a significant issue amongst the independent and international student demographics. These groups often face unique challenges during their college education, making securing stable and affordable housing more difficult. From my personal experience, as

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an independent, first-generation college student who has gone through financial hardship, I found life to be debilitating trying to balance my studies, work, and personal life, all while keeping up with personal finances. This research aims to bring awareness to these marginalized groups and showcase how campus housing security initiative programs are needed. The ultimate goal is to eventually create a scholarship attached to the Lumin Housing Initiative program and encourage the Fort Collins community to fund housing apartments, particularly for students who don't come from generational wealth and need assistance. In the meantime, the data I've collected is based on reports informed to me by the director of the Lumin Housing Initiative, Pastor Paul, and research from Colorado's education system. According to the Colorado Department of Education, in the year 2023-2024, 22,896 students were claimed homeless, including 2,192 unaccompanied homeless youth. At CSU, 2/4 of students are estimated to face housing insecurity or homelessness each semester. Lumin consists of 20 students who make up the 8% at CSU who experience these issues. These students will need some funding for school supplies, home supplies, rent, and groceries each semester. Having to experience housing insecurity has also impacted many students' mental health and their ability to attend college. After interviewing students who live in subsidized housing most students find living in Fort Collins to be above their needs and difficult in terms of affordability. It is a substantial issue that needs to be discussed amongst the CSU community to dismantle the oppression that many students on campus face.

R36 Smartphone-based Vertical Jump Assessment in Research and Educational Settings

Kailyn Ferguson

Brian Tracy

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Research Poster

The vertical jump is a commonly used assessment of leg power often measured using cumbersome lab-based equipment. The aim was to use smartphone sensors to provide a user-friendly and portable vertical jump assessment. Ten women (20-39yrs) performed vertical jumps using both a Vertec device and an iPod Touch secured to the thigh. Subjects displaced the highest vane on the Vertec at the peak of their jump. Peak thigh rotation rate was measured with the smartphone rotation sensor. Jump trials were performed at varying estimated intensities (25%, 50%, 75%, and 3-4 trials at 100% of max effort). Jumps began from a squat position (90deg knee angle) with no countermovement. The goal was to obtain paired Vertec and iPod measures across a range of jump intensities (25-100% of max). Correlations were calculated across the range of jump intensities for each subject. The R2 values averaged 0.83 (0.7 to 0.99). Across subjects, the jump height and the peak rotation rate was positively

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correlated. The results indicate that smartphone sensors can quantify a ballistic vertical jump. This suggests a portable means of measuring vertical jump in athletic and educational settings. Additionally, the affordability and portability provides accessibility in the undergraduate teaching laboratory, where students can engage in hands-on learning without the need for expensive laboratory equipment.

R44 Effects of fatigue and exercise intensity on exercise enjoyment during an outpatient cancer rehabilitation program

Jessica Franson and Emma Gomes

Heather Leach

College of Health and Human Sciences

Research Poster

Purpose: Exercise can improve physical and psychosocial outcomes for cancer survivors, and positive affect or “exercise enjoyment” can increase exercise adherence. This study examined the effect of fatigue and exercise intensity on exercise enjoyment. Methods: Observational study of participants enrolled in a 12-week outpatient cancer rehabilitation program, with exercise sessions (ES) twice per week. Exercise enjoyment was measured after each ES (1= not at all – 7= very much). Fatigue was measured before each ES (0=no fatigue – 10=worst fatigue). Exercise intensity was self-selected, and ES were categorized as low (30-39% HRR & RPE range 9-11) or moderate to high (40-89% HRR & RPE range 12-20). A spearman’s correlation examined the association between fatigue and enjoyment, and an independent t-test compared enjoyment between low vs. moderate-high intensity ES. Results: Participants (N=24) were M=64±11 years old, 83% female, represented 14 different cancer types, and completed N=181 ES. Average exercise enjoyment was 6.2±1.1 (range 2-7). Average fatigue was 3.1±2.4 (range 0-10). Over half (N=102, 57%) of ES were low intensity. Fatigue was inversely associated with enjoyment ($r_s = -0.26$, $p < .001$). There was no difference in enjoyment between light (M=6.3±1.1) and moderate-high (M=6.3±1.0) intensity ES [$t(175) = -0.08$, $p = .94$]. Conclusion: Overall, exercise enjoyment was high, but worse fatigue before an ES was associated with lower enjoyment. There was no difference in enjoyment between low vs. moderate-high ES. These findings highlight the impact of fatigue on exercise experiences and suggest the need for strategies to support engagement on high-fatigue days to maintain adherence even when enjoyment is lower.

R37 Undergraduate neuromuscular physiology lab course project: Sympathetic arousal and muscle force output

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Katie Fray

Brian Tracy

College of Health and Human Sciences

Research Poster

Voluntary cortical drive and brainstem excitatory drive are important influences on motor neuron output. Here we report on an in-class small group laboratory exercise that was part of a university course. Five students generated an experimental design to determine if sympathetic arousal would excite motor neurons, increase neural drive to the muscle, and reduce rate of fatigue. Each student performed seven maximal handgrip contractions over 90s, with (ICE) and without (CON) immersing the other hand in an ice bath (0.5 deg C). The purpose was to induce sympathetic arousal and compare the fatigue rate between CON and ICE. Maximal voluntary force was measured every 15 seconds with the teaching lab data collection system. The order of ICE and CON was counterbalanced between students. The data across time was compared between ICE and CON. For CON, the maximal force declined to 92.4% of baseline for the last three timepoints. For ICE, the maximal force was sustained at 100.7% of baseline at those same timepoints (P values 0.07, 0.08, 0.05 for the ICE vs. CON comparison). Individual responses: 7/9 of the students showed greater strength for ICE during the final 30s. This small group do-it-yourself laboratory exercise supports the idea that sympathetic arousal produces motor excitation sufficient to prevent fatigue. This experiment could be done very inexpensively, with mechanical handgrip dynamometers and pulse oximeters to document sympathetic effects on heart rate.

R67 Exploring Food, Cultura, & Health: Curriculum focused on a Decolonized Nutrition Framework Within Higher Education

Melissa Gonzalez, Emily Bushell, Ana Morales, and Sadie Montez

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Research Poster

Using a mixed-method approach to build our research we designed curriculum to focus on cooking workshop-based interventions. The use of surveys and semi-structured interviews allow us to capture more comprehensive data. Through our methodology, we aim to address a gap in research by answering, “How can culturally relevant nutrition interventions in higher education institutions address food insecurity and literacy among Latinx/e college aged populations?” By integrating Yosso’s Cultural Wealth Model, Bandura’s Self Efficacy Theory, and Decolonized Nutrition framework into our program, we expect individual self-efficacy, food

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security, and nutrition literacy to increase among participants. By actively demonstrating cooking skills combined with nutrition concepts through the lens of a student's lived experience we can allow for greater connections and higher self-efficiency. 1 This method also uplifts and highlights several forms of capital to reinforce behaviors.2 Research has shown that nutritional education interventions among college students positively influence eating behaviors compared to individuals who do not receive nutrition education. 3 After participants complete the program, we expect quantitative data from pre- and post-surveys and qualitative data obtained from discussions to indicate an overall increase in self-efficacy, food-security, and nutrition literacy in the CSU student population.

R41 Trail Blazing: The Effect of Habitual Cannabis Use on the Runner's High

Kate Green and Aaron Falk

Christopher Bell

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Research Poster

The endocannabinoid system is an important regulator of multiple physiological functions, including the runner's high, an energized sensation experienced during exercise. Habitual users of products derived from *Cannabis sativa* L. are exposed to exogenous cannabinoids that utilize the endocannabinoid system. Chronic cannabis use may downregulate endocannabinoid release during aerobic exercise. We hypothesized that the endocannabinoid response to standardized exercise would be attenuated in habitual users of cannabis products compared with non-users. 18 adults, comprising 12 non-users (7M/5F, age: 27 ± 6 years, maximal oxygen uptake (VO_{2max}): 59.4 ± 8.9 ml/kg/min, no cannabis use in the past 6 months) and 6 users (4M/2F, age: 26 ± 5 years, VO_{2max} : 51.7 ± 11.3 ml/kg/min, cannabis use minimum 3 times per week for the past 6 months) completed treadmill exercise at 65% VO_{2max} for 60 minutes; arterialized blood was drawn from a dorsal hand vein prior to, during, and following exercise and analyzed for the endocannabinoid, anandamide (AEA), concentration. Participants were asked questions to determine their perceived energetic levels from a 0 ("do not feel") to 4 ("feel very strongly") scale. Preliminary data indicate that the area under the AEA response curve may be smaller ($P=0.16$) in users (22.6 ± 5.8 (ng/ml) x min) compared with non-users (27.8 ± 7.9 (ng/ml) x min). Average perceived energetic levels were reported to be lower in cannabis users compared to non-users (NU: 2.3 ± 0.4 arbitrary units, U: 1.8 ± 0.2 AU). These initial observations imply that the contribution of the endocannabinoid system to physiological regulation may be attenuated in habitual users of cannabis products and requires further investigation.

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W3 A Colorful Mind

Nevaeh Greene

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Written Work

Clarissa (Clarity) Iris does not need help. Life is just unfair. One bad father- and a traumatized mother... and twelve months' worth of homework thrown into one week... and one mention of some wishes to go to sleep forever- and you get thrown in the nut house. Maybe that's offensive to crazy people. She doesn't know. All she knows is she's in a mental institution and is stuck here for two weeks. Clarity Iris' mind needs help. It shouldn't be this hard to keep a teenager alive, especially one who has free rent, food, and unconditional love and support in her identity. Mostly. But the worst part? There's one person who would know what to do and no one can find her. She runs everything around here, and not a single person can remember where she was last or where she said she was going. This short story explores what goes on in the mind when someone is going through a hard time. It focuses on stereotypes about mental institutions, trauma, and getting help for your mental illness. A Colorful Mind is a deep dive into the mind of a black, queer, struggling college girl who doesn't know what else to do. What more could go wrong at this point?

R47 Colonial Influence and Cultural Appropriation in 19th-Century American Dress

Megan Greenly

Paula Alaszkiwicz

College of Health and Human Sciences

Research Poster

Over the past fifteen years, Western fashion brands have repeatedly faced accusations of cultural appropriation for profiting from the exploitation of marginalized cultures. While cultural exchange in fashion predates the 21st century and has been studied by historians, there is little scholarship connecting these past interactions to contemporary cultural appropriation. My research investigates how American dress from the 1860s reflects the colonial dynamics of its time and connects to recent issues of appropriation. The dress is made from a patterned silk combining two culturally distinct motifs: tartan and ikat. Tartan originated in Scotland and moved through colonial networks from the Indian subcontinent, the Caribbean, and West Africa. Ikat, or warp-resist dyeing, is found in the textiles of Indonesia, India, Japan, and Uzbekistan. Additionally, this dress features recognizable pagoda sleeves, referencing Asian

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architecture. These design details align with the expansion of European and American colonial powers, fueled by the harmful ideology of the “civilizing mission.” Yet, paradoxically, Euro-American fashion and textiles incorporated culturally significant styles from colonized peoples. To analyze the garment, an inductive material culture method, specific to historical dress artifacts, will be employed. Using this method and drawing from my fashion design studies, I will identify the garment’s construction details and utilize contemporaneous fashion illustrations to determine its origins, timeline, potential alterations, and similarities to popular fashions of the time. I argue that this dress, made by a colonial power with styles from colonized regions, reflects the power dynamics of recent cultural appropriation.

R29 Supporting Student Success: A Comprehensive Approach to Helping First Generation, Disabled, and Limited Income Students Overcome Academic Probation

Madeleine Kamberg

April Cano-Garcia

College of Health and Human Sciences

Research Poster

This is the presentation of the literature review, research study, and subsequent proposal made regarding how to best help students who have not met Satisfactory Academic Progress get back to the standard of meeting SAP requirements, including but not limited to: GPA, credits attempted vs. credits earned, and/or 150% of total degree completion. The findings from this study are intended to contribute to the success of the programming offered through the TRIO Student Support Services program in the Academic Advancement Center which serves first generation, disabled, and limited income students. However this research could potentially help inform student success overall. The research has been conducted as a part of a BSW senior internship experience in the School of Social Work. This year-long project was implemented in several phases: exploration of existing data for student success, the design and implementation of a study interviewing students about their first hand experiences, analyzing the results, and comparing current and previous programming to build a future plan for success.

R50 How Do Children with Autism Talk About Their Feelings, a Content Analysis

Olivia Katsirubas, Amanda Tatman, and Ryleigh O'Donnell

Susan Hepburn

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Research Poster

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Background: Emotional awareness is crucial for adaptive functioning, yet some children with Autism Spectrum Disorder (ASD) often experience difficulties in identifying, describing, and regulating their emotions. Alexithymia, a condition characterized by deficits in emotional awareness, is prevalent among individuals with ASD and is associated with challenges in social communication and psychological well-being. While research on alexithymia in ASD has largely focused on adolescents and adults, little is known about how younger children (ages 7-12) describe their emotions and recognize physiological cues associated with them. This study examines how children with Autism (ages 7-12) verbally express and identify their experiences of four primary emotions - happiness, fear, anger, and sadness - and whether their verbal behaviors align with the core constructs of alexithymia. Methods: This qualitative content analysis utilizes secondary data from a longitudinal study of 284 children with ASD, focusing on 30 verbally fluent participants, matched by gender and IQ, who completed Module 3 of the Autism Diagnostic Observation Schedule (ADOS-2). Verbal and nonverbal responses from an eight-question emotions interview were coded for thematic patterns, with emphasis on difficulty identifying feelings (DIF), difficulty describing feelings (DDF), and externally oriented thinking (EOT). Preliminary Results & Conclusion: Coding is ongoing, with initial analyses suggesting variability in emotional expression, particularly in differentiating psychological cues associated with emotions. Findings will contribute to a deeper understanding of emotional processing in youth with ASD and inform interventions that support healthy emotional identification, communication, and regulation.

R38 Four inexpensive, accessible smartphone-based neuromuscular physiology experiments for the teaching laboratory

Shea Kramer

Brian Tracy

College of Health and Human Sciences

Research Poster

An experiential teaching lab environment engages and motivates students with learning materials. Here we describe four very inexpensive and easily accessible smartphone-based motor control/variability labs. Sensors in common smartphones are used to measure acceleration fluctuations in limb and body movement.

Physiological arousal – An ice bath is used to induce a sympathetic response. Heart rate (pulse oximeter) and fluctuations in forearm acceleration (smartphone) are measured in the test arm. More motor variability and increased heart rate are observed during the ice condition.

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Archery/contralateral overflow – A laser pointer mounted on a hunting bow is aimed at a 10cm target from a 30m distance. A smartphone is used to measure tri-axial accelerometry changes from the bow. Two conditions are compared: 1) pull the bowstring (23kg), 2) no pull. The change in motor variability during a more intense task is observed.

Contralateral motor overflow – The position of a test arm is controlled under two conditions: contralateral arm held in position with/without a weight (50% max). Triaxial fluctuations of the test arm are measured with a smartphone. Conditions are compared to reveal contralateral overflow of motor excitation.

Balance/proprioception – Postural stability (ant/post, med/lat) is measured with a smartphone in four conditions: hard surface eyes open/closed, soft surface eyes open/closed. Manipulation of sensory information reveals the importance of the different inputs.

R48 Mental Health and Metabolism: How Trauma is Shaping Blood Markers in Adolescents

Miles Liss, Lauren Shomaker, Shelley Haddock, and Toni Zimmerman

Reagan Miller

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Research Poster

Approximately 20% of adolescents exposed to significant adversity experience post-traumatic stress disorder (PTSD). Research suggests that PTSD can have long-term consequences for adult psychopathology and increase the risk of developing cardiometabolic diseases in adulthood. However, less is known about how PTSD is associated with cardiometabolic health indicators (e.g., elevated blood pressure, lipids, fasting glucose, and insulin resistance) during adolescence. In this pilot study, we explored the relationship between PTSD and cardiometabolic health markers, including high density lipoprotein (HDL) and low-density lipoprotein (LDL), cholesterol, triglycerides, glucose, and insulin resistance among adolescents exposed to adversities. Participants were 79 adolescents enrolled in a mentoring program for youth (10-18 years old; MAge=13.2, SD=1.7; 52% male), who have been exposed to adversities. 65% self-identified as Caucasian, 20% as Latinx, 3% as Black, 3% as mixed race, 1% as Native American, and 1% as Asian. A fasting blood draw was used to assay cholesterol, triglycerides, glucose, and insulin. The homeostatic model assessment of insulin resistance (HOMA-IR) was used to estimate insulin resistance. Bivariate correlations revealed that cholesterol, specifically higher LDL, was positively correlated with PTSD symptoms with a moderate effect size. Caucasian females had higher PTSD symptoms than male, non-Caucasian individuals. In addition, adolescents who were non-Caucasian had higher insulin resistance than Caucasian adolescents. These results highlight how childhood adversities and PTSD symptoms may have implications for cardiometabolic health among adolescents with minoritized identities. Going

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forward, it may be important to study effective strategies for buffering adolescents against the negative effects of traumatic experiences.

R52 Age and Exercise Associated Differences in Subjective Age, Cognitive and Motor Function

Hannah Martin

Thomas LaRocca

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Research Poster

Aging leads to a decline in cognitive and neuromuscular functions, but exercise may play a role in decreasing or preventing that decline. The recently developed NIH Toolbox provides a battery of tests to measure cognitive and motor functions. These tests are intended to detect the changes in these functions that occur with aging. However, the effectiveness of these tests for detecting functional differences with exercise/aging has not been studied comprehensively. Furthermore, some data suggest that simpler tests such as the perceived subjective age survey may be just as effective at detecting differences in aging rates. Therefore, to investigate the effectiveness of these tests regarding aging and exercise, a cross-sectional human research study was conducted. We recruited young (aged 18-34) and old (aged >65) participants who were either sedentary or habitual exercisers. Participants completed standardized questionnaires regarding sleep habits, stress levels, and perceived subjective age. Then, using the NIH Toolbox, we evaluated cognitive and motor functions. A blood sample was also collected to test for standard risk markers that might reflect differences in disease risk/health. This poster will summarize our findings on the effects of exercise and aging on cognitive and neuromuscular functions, as well as any related differences in subjective age and other parameters.

R54 Impact of Menopause on Women with MS

Sydney McKibbin

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Research Poster

Multiple sclerosis (MS) is a chronic neurodegenerative disease that disproportionately affects women, many whom experience menopause during their disease course. The hormonal changes of menopause—especially the drop in estrogen—can make MS symptoms like fatigue,

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brain fog, and bladder issues worse, possibly speeding up disease progression. Despite these challenges, the link between MS and menopause is often overlooked in healthcare, leaving many women without the support they need. This study looks at survey data from postmenopausal women with MS to better understand how menopause affects symptoms like fatigue, cognition, pain, bladder dysfunction, and exercise habits. The findings reveal significant struggles: 51% of participants reported worsening fatigue, 66% noticed cognitive decline, and 46% struggled to meet physical activity guidelines due to exhaustion and longer recovery times. Despite research showing potential benefits, hormone therapy (HT) use remains low. Even more concerning some respondents experienced at least one adverse symptom after menopause. Yet, 66% of those women never discussed these changes with their healthcare providers—further highlighting the lack of awareness and education about women’s health. These findings make it clear that postmenopausal women with MS need better, more individualized care. Tailored exercise programs, cognitive support, and further research into hormone therapy could help manage symptoms and improve quality of life. Moving forward, healthcare providers must recognize and address the unique challenges these women face.

W2 Zoey Goes to the Park: Integrating the Moro Reflex

Chloe Olson

Katherine Gerst

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Written Work

Primitive reflexes are involuntary responses that come from the brainstem as a reaction to specific stimuli that develop even before birth. As a child grows up, these reflexes should disappear or mature and integrate into different reflexes. If they do not, the unintegrated reflexes can cause a range of motor, emotional, social, and/or learning related issues. One of the first primitive reflexes to develop is the Moro reflex, and this reflex then typically integrates by 4-6 months old. However, for many children this does not always happen. To treat this, there are many occupational therapy exercises that can target the reflex and promote integration. This is what inspired the creation of the children’s book, *Zoey Goes to the Park: Integrating the Moro Reflex*. This book encourages children to imitate movements of different animals. These animal movements are also exercises that help integrate the Moro reflex. The book allows for children to get involved and have fun while also benefiting their development. It also gives parents the opportunity to get involved in the process as well, as this book can be used as a tool to continue work outside of occupational therapy sessions.

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R51 Modulating double-stranded RNA with a lentivirus in human astrocytes

Alexa Pacheco and Cali McEntee

Thomas LaRocca

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Research Poster

Astrocyte-related inflammation is a key contributor to neuroinflammation with brain aging and Alzheimer's Disease (AD). However, the exact causes of pro-inflammatory astrocyte activation and processes that may prevent it are incompletely understood. One potential cause of pro-inflammatory signaling in astrocytes may be endogenous double-stranded RNA (dsRNA) transcripts. These "self" dsRNAs likely originate from non-coding regions of the genome (that do not code for proteins) and can accumulate in a cell due to dysregulated dsRNA degradation processes. To determine if degrading endogenous dsRNA might reduce inflammation, we transduced primary human astrocytes with a lentivirus containing a green fluorescent protein (GFP)-tagged Lassa Virus dsRNase (an enzyme that breaks down dsRNA). We quantified the presence of the dsRNase and inflammatory markers via immunoblotting, and in astrocytes with increased dsRNA levels but expressing the dsRNase (positive for GFP), we observed a modest decrease in intercellular adhesion molecule 1 (ICAM-1, a marker of astrocyte-related inflammation). Together, these data suggest that endogenous dsRNAs may in fact contribute to astrocyte inflammation, and that the transduction of an exogenous dsRNase may be a viable strategy to modulate this dsRNA-related inflammation. To follow up on this experiment, we are profiling additional markers of pro-inflammatory signaling and identifying the potential sources of dsRNA.

R43 Combating Alzheimer's Disease by Enhancing Tau Clearance

Steven Payne and Thomas LaRocca

Daniel Lark

College of Health and Human Sciences

Research Poster

Background info: Alzheimer's Disease (AD) is a neurological illness that affects almost 7 million Americans. Tau protein accumulates in cells of the brain during AD and contributes to impaired cognitive function. Clearing pathogenic tau has been a priority of recent therapies for AD, but these treatments have failed clinical trials. We have identified a novel target that may help eliminate tau and explain why these drugs have failed. Preliminary Data: Cells can eliminate tau

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by creating endosomes using the protein CHMP2A but this gene/protein is decreased in neurons as they age and during AD. Restoring CHMP2A levels in directly induced patient-derived neurons (iNeurons) decreases intracellular tau by ~50% due to increased tau secretion. These findings suggest that restoring CHMP2A levels in neurons could decrease tau in the brain and preserve cognitive function during AD. My Project: I will test if restoring CHMP2A in iNeurons from humans with AD increases the secretion of tau in extracellular vesicles (EVs). I will do this by isolating the EVs using size exclusion chromatography then quantifying them using nanoparticle tracking analysis. I will also “capture” EVs using antibodies to measure tau in EVs versus tau protein aggregates. The long-term goal of this project is to establish CHMP2A as a possible target for AD treatment and determine if restoring CHMP2A enhances the benefits of tau immunotherapy.

O6 Transforming Sustainability and Well-Being in Public Transportation Facilities: The Sustainable Retrofit of an International Airport

Kaylee Redlin

Jain Kwon and Laura Cole

College of Health and Human Sciences

Oral Presentation

The Orlando International Airport Retrofit Project rethinks the conventional construction and operation of transportation facilities. Currently, many large transit hubs around the country lack progress in sustainability initiatives and fall short in user-centric design strategies. By assessing the site’s current conditions, analyzing user needs, and identifying existing challenges, the project develops key solutions related to sustainability and user-centric design. These solutions improve building efficiencies, reduce accessibility barriers, and enhance user satisfaction for the diverse occupants that an international airport services. Given the prevalence of already built public transportation facilities, retrofits that prioritize sustainability are important to consider. This project explores renewable energy and resource recycling to initiate a shift from building systems and materials that currently have high carbon emissions. By integrating more eco-conscious solutions into our built environment, we will begin to see a reduction of carbon emission as well as an improvement in the physical and mental well-being of all users. The project also implements extensive evidence-based design solutions surrounding wayfinding and accessibility. The integration of legible signage and personal technological applications will help create a structured wayfinding network that is personalized to the unique needs of every user. Comprehensive wayfinding plays a crucial role in an airport setting and helps to reduce user stress by providing a setting that encourages efficient and effortless travel. By creating an environmentally conscious and user-centric space, this project

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can create precedent for more equitable and inclusive experiences in public transportation hubs.

C5 Investigating the Biopsychosocial Factors Impacting Eating Disorder/Disordered Eating Etiology, Treatment, and Advocacy Within the LGBTQIA+ Community

Audra Richister

Brittney Sly

College of Health and Human Sciences

Community Engagement Poster

Eating disorders are increasingly prevalent illnesses, discriminating against no one. A demographic affected by them in particular is the LGBTQIA+ community. There are a variety of factors impacting these disproportionate occurrences, as demonstrated by the biopsychosocial model of eating disorder etiology. This model may also translate to eating disorder advocacy and care, which is especially pertinent given not only the current oppressions faced by the LGBTQIA+ community in healthcare and modern society, but also given the severity and prevalence of eating disorder patienthood in relation to such. The aim of this thesis is to investigate different factors (biological, social, psychological, and cultural) as they relate to eating disorder development, care systems, and advocacy for either through a queer perspective, as well as to discuss future directions of healthcare and research and construct a basis for more holistic, inclusive, and just systems.

R55 Impaired Balance After Cannabis Use in Older Adults: Smartphone Measures.

Valeria Salinas-Vargas

College of Health and Human Sciences

Research Poster

Cannabis use by older adults is increasing. Our aim was to use smartphone technology to determine the effects of cannabis on balance and describe the correlation with blood THC level in older adults. Older adults comprised the cannabis group (N=143, 71yrs) and 49 (70yrs) served as non-using controls. In a mobile laboratory vehicle, balance was measured before, 60, and 120 min after cannabis ingestion. Blood THC was measured before and at 120 min. An iPod Touch recorded A/P and M/L acceleration during 30 s trials of quiet standing in four conditions: eyes open hard surface (EOH), eyes closed hard surface (ECH), eyes open soft surface (EOS), eyes closed soft surface (ECS). The standard deviation (SD) of acceleration was measured and

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summed across the A/P and M/L directions. There were no changes across time for the control group. For cannabis users, balance was impaired at 60 min and 120 min after ingestion for all postural conditions ($P < 0.01$). At 60 min the impairment was 12% for EOH, 7% for ECH, 10% for EOS, and 13% for ECS. Blood THC at 120 min was very weakly correlated with balance impairment at 120 min ($R^2 = 0.11$, $P < 0.01$). Smartphone sensors can detect changes in balance across varying conditions. For older adults, edible cannabis produced lasting impairment in balance that was only weakly correlated with blood THC. Balance is often impaired in aging, thus cannabis use by older adults deserves more attention in the context of safety and injury prevention.

R31 Associations between Thalamic Volume and Motor Impairment in People with Multiple Sclerosis

Kaylee Sandefur

Brett Fling

College of Health and Human Sciences

Research Poster

Multiple Sclerosis (MS) is a nervous system disease in which the immune system abnormally attacks the myelin sheath, a fatty layer that insulates and protects neurons. Damage to the myelin sheath leads to impaired neural communication and subsequent adverse health. Our understanding of these neural impairments, including their identification, monitoring, and treatment, remains limited. Brain imaging offers a tool for connecting brain health and symptomology in MS, by identifying areas of atrophy, injury, or structural changes, and linking these to clinical symptoms. The thalamus is a vital brain region that receives all sensory information entering the nervous system, except for smell, and relays it to cortical regions for processing. The thalamus is also highly interconnected with motor circuits, highlighting its role in modulating movement. While recent research has linked thalamic volume to impaired cognitive function and aerobic fitness, its relationship with clinical mobility and balance tests remains unclear. Therefore, the purpose of this study was to assess the relationship between thalamic volume and balance performance in individuals with MS compared to healthy controls.

Brain scans were collected using magnetic resonance imaging and brain and thalamic volumes were measured for each participant using Free Surfer. Participants completed the Mini Balance Evaluation Systems Test to evaluate four main balance systems: anticipatory postural adjustments, postural control, sensory orientation, and dynamic gait. This study builds on efforts to characterize the impact of brain health on mobility and balance, by examining the relationship between thalamic volume and clinical assessments of mobility and balance.

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O4 Research-based hospitality design exploring Southern Chinese people's place attachment

Campbell Schildt and Zining Zhu

Jain Kwon

College of Health and Human Sciences

Oral Presentation

This research-informed design project explores Southern Chinese natives' place attachment, aimed to invoke an emotional and cultural connection among visitors of a Southern Chinese background. We gained insight into place attachment through theoretical study and then conducted user interviews, observation, and site analysis. Place attachment refers to the emotional and psychological bond individuals establish with their surroundings over time. People, even from the same region, develop various attachments based on daily routines, spatial settings, and social statuses. Research shows that 1) collective experiences can form a socio-cultural bond among people; 2) individuals of a Southern Chinese background tend to build a bond with the earth as humanity's foundation; 3) geographical features—hills, wetlands, farms—can impact a sense of belonging; 4) attributes like texture, sound, or color contribute to culturally inspired design. Informed by precedent research studies, this project applied place-attachment principles through geographical reflection, space planning, and interior detailing. Through this project, we created a place for respite and excursion, where people can relax and find emotional comfort stemming from cultural familiarity.

R42 Chronological Age, Sex, and Muscle Fiber Type as Determinants of Extracellular Vesicle Secretion and Diameter in Mice

Ellie Shyu, Darby Easterday, Devin Wahl, Shelby Osburn, and Thomas LaRocca

Daniel Lark

College of Health and Human Sciences

Research Poster

Background: Extracellular vesicles (EVs) enable cellular communication and are secreted by all organs of the body, including skeletal muscle (SkM). Aging is associated with changes in EV characteristics, but its impacts on EV secretion and diameter are poorly defined. Methods: This study analyzed the effects of biological age, sex, and SkM type on EV secretion and diameter. SkM was collected after euthanasia, cut into 5 mg pieces, and incubated in cell culture media for 24 hours. We isolated EVs from conditioned media and quantified them. A 3-way ANOVA

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was performed with Tukey multiple comparisons testing. Results: No significant main effect or interactions was observed for age, sex, or tissue type, but there was a trend ($p = 0.10$) for a sex x age interaction. There was a main effect of tissue, sex and age on mean EV diameter but no significant interactions between variables. Multiple comparisons analysis did not clearly explain differences across variables. There was a main effect of sex and a significant tissue x sex x age interaction on modal EV diameter. No individual differences were observed in multiple comparisons testing for modal EV diameter. Conclusion: This data suggests that aging may not decrease SkM EV secretion, and that sex may be a relevant variable in age-dependent changes to secretion. EV cargo is another major factor for EV function, so our ongoing work examines differences in EV composition. Differences in EV cargo may be indicators of diseases.

R33 Experiential student lab project: Measures of the stretch reflex electromyogram

Hannah Sims

Brian Tracy

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Research Poster

Hands-on exposure to sophisticated quantification of the commonly studied stretch reflex is valuable for learning. However, lab-grade electromyogram (EMG) systems are expensive. Undergraduate students in a lab class compared the stretch reflex (patellar tendon tap) EMG responses from an expensive lab-grade and inexpensive consumer-grade EMG device. Stretch reflex responses were acquired from seven students using two separate EMG systems (lab-grade: ADInstruments, ADI, consumer-grade: Backyard Brains Spikerbox, BYB). Electrode pairs from each system adjacently placed over the rectus femoris muscle. Sixty tendon taps (10 soft, 10 medium, and 10 hard taps during control and Jendrassik maneuver) were performed on each student and the EMG responses were recorded. The root mean square (RMS) values of the EMG responses were correlated (420 pairs of values) between devices for each student. For each student, the 60 pairs of values (control, Jendrassik) were positively linearly correlated between the devices. For the seven students, the R-squared values for the regression between devices were 0.46, 0.85, 0.86, 0.87, 0.90, 0.91, 0.95 (all $P < 0.05$). The results indicate that the portable, inexpensive consumer-grade EMG system (Backyard Brains, Inc.) is an acceptable alternative to lab-grade equipment for assessing the electrophysiology of the stretch reflex in the teaching lab. Such equipment would increase accessibility for both university and secondary physiology education.

R39 Resilience and Anger: Negative Associations Among Youth who Experienced Trauma

College of Health and Human Sciences

Hailey Stamps, Christine Rizzo, and Stephanie Seng

Brock Rigsby

College of Health and Human Sciences

Research Poster

Anger is classified as a normal emotional response to perceived threats, frustrations, and injustices (DSM-5, 2013). Although anger may be adaptive at times, it impacts behavior, cognition, and ability to maintain social support systems (Novaco & Keltner, 2019; Troy et al., 2023; Dougherty, 2006). As such, exploring the impact anger and other symptoms have on a youth's ability to demonstrate resilience following trauma is important in designing and selecting effective services. We evaluated associations between mental health symptoms and resilience among youth referred for a trauma and resilience assessment. Participants were 71 youths (Mage=12.44; SDage=2.76; 88.73% white; 52.11% male) and their caregivers. As part of these assessments, caregivers and youth completed surveys online via PARi Connect. Mental health symptoms were self-reported (TSCC; Briere, 1996) and caregivers reported on resilience (SEARS-P; Merrell, 2011). We fitted a linear regression in R with TSCC subscale scores predicting the total score on SEARS-P. Controlling for key demographics, we found a significant negative association between anger symptoms and resilience ($b=-55.51$, $SE=21.23$, $p=.011$). Demographic variables were not significantly predictive of resilience in our model, and did not significantly improve model fit: $F(3,62)=.005$, $\Delta RSS=1.37$, $p=.999$. Our findings indicate that among youth who experienced trauma, angrier youth may have lower resilience and thus higher need for services.

R30 The Relationship between Exercise and Corticospinal Tract Health in People with Multiple Sclerosis

Leah Tasker and Christopher Patrick

Brett Fling

College of Health and Human Sciences

Research Poster

Multiple Sclerosis (MS) is a neurodegenerative disorder of the central nervous system characterized by the destruction of myelin, a fatty protective substance that is essential for neuron signaling and structural health. Myelin damage disrupts the transmission of signals and compromises structural integrity, impairing communication between the brain, spinal cord, and muscles of the body. Impairment to neural communication in MS leads to a variety of symptoms that negatively impact daily life. Specifically, balance and mobility impairments are

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often the most reported symptoms of MS. The corticospinal tract (CST) is the primary pathway in the brain that transmits motor signals to the spinal cord facilitating voluntary motor control. In individuals with MS, demyelination within the CST disrupts motor signals, contributing to difficulties in balance and mobility. Previous studies have shown that physical activity may influence myelin preservation and support remyelination in the brain. In this study, individuals with MS were recruited to assess the association between CST structural integrity and exercise. Diffusion magnetic resonance imaging (dMRI) techniques were used to examine CST white matter integrity and exercise history was used to group MS participants into anaerobic and aerobic groups. Mobility was assessed using the Timed Up and Go (TUG) test, a common clinical assessment which measures the time taken to stand up from a chair, walk seven meters, turn, and return to the chair. Our research expands on efforts to characterize brain health and mobility in individuals with MS, by examining the relationship between aerobic and anaerobic exercise and CST structural integrity.

P1 Belly Dance Club Musical Presentation

Antonella Torres Peralta

College of Health and Human Sciences

Performing Art

The Belly Dance Club, founded in Fall 2023, presents a 5-minute choreography celebrating the beautiful art of belly dance. This club aims to empower individuals to get to know their bodies, connect with their bodies, and celebrate what they can do. Belly Dance is an ancient art form from the Middle East that started as a way to celebrate femininity and childbirth. Nowadays, everyone is welcome to belly dance and connect with this culture that empowers us to love our bodies and connect with the world through gentle and spiritual dance moves.

Performers: Antonella Torres Peralta (President and Founder), Kayla Dailey (Vice-President), Audra Richister (Treasurer and Secretary), and members Elise Kelley, Manaya Golatt, Patricia Garcia, Heidi Wagner, Alejandra Amador, Marc Smoorenburg, and Hank Dundon.

R40 “Let’s Get this Bread” ; How Diverse Sourdough Starters Impact the Final Glycemic Index of Bread

Bo Wallace and Chelsie Miller

Charlene Van Buiten

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Research Poster

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Bread is a global dietary staple, yet its production contributes to significant food waste and fails to meet evolving consumer demands for clean label, nutritionally optimized products.

Sourdough fermentation, an ancient bread making process, offers a natural means to enhance bread's nutritional profile. This study investigates how the microbial composition of sourdough starters influences resistant starch content and glycemic index in bread. By characterizing starch chemistry changes throughout fermentation, we aim to determine whether specific microbial communities promote higher resistant starch levels, thereby improving glycemic response. The findings will contribute to broader efforts in food science to develop functional, nutritionally enhanced bread while supporting sustainable food production practices.

R45 Effect of Honey Supplementation on Muscular Endurance

Megan Weiler

Jennifer Riley

College of Health and Human Sciences

Research Poster

Honey is a glucose-rich substance, promoting adenosine triphosphate (ATP) production through cellular respiration. ATP is required for muscle contractions, with diminished ATP levels contributing to fatigue. Honey supplementation before exercise may delay ATP depletion through elevating glucose levels, thus lengthening ATP availability. This delay may also enhance muscular endurance by allowing more physical exertion before the onset of fatigue. This study was conducted to determine the effect of honey supplementation on muscular endurance.

Eight participants were analyzed, utilizing their ideal bicep curl weight between ten, twelve, and twenty pound dumbbells. Over two weeks, two sets of dominant arm bicep curls until failure were observed. Only one week required honey supplementation. After honey supplementation, participants waited five minutes before their bicep curl set. Bicep curl form was kept consistent throughout each set. Results indicate no statistically significant improvement in performance ($p = 0.21$). Participants who used a twelve pound dumbbell had the lowest p value, though it was still not statistically significant ($p = 0.16$). Seven participants improved after honey supplementation with an average increase of 6.75 repetitions. These findings suggest honey may help improve muscular endurance, but further research must be done to solidify this claim.

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R46 SUSTAINABLE DESIGN OF FOOTWEAR BY UTILIZING MYCELIUM BASED BIOMATERIALS AND 3D PRINTING TECHNOLOGY

Alexander Wood

Lida Aflatoony and Yan Li

College of Health and Human Sciences

Research Poster

This research project aims to create a procedure for developing mycelium-based composite molds through the means of 3d printed molds. These composites are composed of two main components: the substrate and the mycelium itself. Mycelium is the root organism of fungal mushrooms. Substrates for mycelium-based composites can vary from almost all natural substances. However, throughout this research cellulosic substrates have proven the most effective substrates for mycelium-based composite due to the high concentration of starch. As well, mycelium has proven to develop a stronger structure for the composite when the substrate consists of cellulosic materials. Finally, cellulosic substrates can be found in an abundance of waste from various industries. Nevertheless, the purpose of this research project is to improve the sustainability of the fashion industry. More specifically this research is centered around innovating sustainable footwear components. The footwear industry is growing at a more rapid rate than other sectors of the apparel industry. However, the true importance of implementing mycelium composites into the footwear industry is the current state of the footwear industry. The footwear industry often features materials very harmful to the environment due to their composition featuring synthetic compounds. On the other hand, mycelium composites are completely biodegradable in different ecosystems making them a perfect candidate for sustainable footwear materials. Also, mycelium composites reduce waste from other industries promoting a circular economy.

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V5 Pollution vs The Environment

Megan Bartholomew

College of Liberal Arts

Visual Art

My current art practice is based on the relationship between pollution and the natural world. Many issues affecting wildlife on a global scale from the Great Pacific Garbage Patch to the Ghazipur landfill in Delhi, have inspired me to create a series of work to address a variety of pollution types. In my Pottery 3 class, I am creating a line of ceramic purses that each focus on topics such as air pollution, water pollution, textile waste, food waste and overconsumption. I am making a set of handbags so that the wearer has to bear the weight of these destructive events that only seem to be getting worse. The bags are meant to be uncomfortably heavy or hard to hold onto, much like the environmental impacts that are slowly getting out of hand. Not only do I want my audience to be inspired to reduce their carbon footprints, I also want to highlight the importance of purchasing ethical clothing, as the fast fashion industry has some of the most dramatic effects on terranean and oceanic ecosystems. To call attention to this topic, I will be using a “recycled glaze” or Franken-glaze (made from the waste bin we have in the studio where students dump their old or unwanted glazes into one big bucket) instead of using new glaze on this series of sculptures. I can present 2-3 of these sculptures as well as examples of the recycled glaze to explain my creative process and the concepts behind the pieces.

F8 BREEDING RESILIENCE: Feeding the Population

Abby Burns and Giovanna Paterno

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FILM

How much science goes into farm to table products? The TSF team takes a deep dive into the CSU Wheat Breeding and Genetics program to answer that question. From outreach to local growers, to molecular analysis for wheat stem sawfly resistance, to baking for science, the CSU Wheat Breeding Program tackles the problems of growers within the four corner states, keeping bread on all our tables!

R58 Identifying Short-Term Occupation through Mass Analysis: Insights from Texas Creek Overlook (5RB2435) Rio Blanco County, Colorado

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Katie Calhoon

Jason La Belle

College of Liberal Arts

Research Poster

Texas Creek Overlook (5RB2435) is an archaeological site located in Rio Blanco County, Colorado. It features a wet-laid masonry structure situated atop a small sandstone pinnacle overlooking the Colorado Plateau. The site is culturally affiliated with the Fremont, a pre-contact Native American culture that inhabited the region until approximately A.D. 1300. In 1983, Western Wyoming College conducted excavations at Texas Creek Overlook and identified three rooms within the masonry structure. Of the artifacts recovered, 98% consisted of flaked lithic debris. Based on these findings, Creasman and Scott (1987) argued the site functioned as a habitation and faunal procurement camp. However, the nature of habitation, in terms of the duration of site occupation (short-term versus long-term), remains unknown. Additionally, the spatial distribution of flaked lithic debris via density per square meter, per excavated room, remains unknown. Such facets of Texas Creek Overlook can be explored primarily through mass analysis, supplemented by image analysis software and lithic tool analysis. This research deepens our collective understanding of the Fremont culture while demonstrating the importance of curated collections—preserved not only to examine the past, but to support ongoing inquiry as new technologies and questions emerge. By integrating archaeological investigation with museum curation, this project emphasizes the power of hands-on, interdisciplinary learning, which offers students a rare opportunity to engage directly with the past and develop skills, along with a sense of purpose, that extends far beyond the classroom.

F6 Facing the Spirit of the Mountain

Adam Carlson

College of Liberal Arts

FILM

A look into the psychic space one may enter while climbing a dangerous mountain. The physical and mental challenges of these mountains send someone's mind into a meditation and a slog at times. The experience can be exhausting and incredibly profound and can shape the way someone approaches the world. Facing the Spirit of the Mountain attempts to capture and portray that feeling and experience to someone who may never climb a dangerous mountain.

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R67 Mental Health Conditions in California Prisons

Elena Crooks

Jessica Harney

College of Liberal Arts

Research Poster

Prison overcrowding has been a weighty and controversial issue in the United States for many years. The increase of violence and health issues has raised a lot of concern about the way that the incarcerated individuals are treated while in the prisons. The more overcrowded a prison is, the less access to resources the inmates have. Additionally, the inmates are not the only people affected by these conditions. The prison staff and workers have felt a great amount of stress and burnout from working in the overcrowded prisons. I became interested in studying this issue when I began my position as a research assistant with CSU Professor Jessie Harney. Professor Harney is studying a multitude of factors related to prison overcrowding across thirty-three different prisons in California. In collaboration with Professor Harney, I will present an exploratory correlational analysis of the mental health conditions of these prisons in California. I will explore how the percentage of the prison capacity that is filled correlates with three specific outcomes in the prisons: sexual misconduct, attempted suicides, and suicides.

R64 Food Insecurity at CSU in a Post-Covid Context

Ashlee Czyz, Kaya Tanios, and Halee Wahl

Meagan Todd

College of Liberal Arts

Research Poster

Food insecurity, which could be defined as “the lack of regular access to nutritious food due to financial or developmental barriers,” is a rapidly growing concern in the United States, with an increasing number of people unable to afford enough food, which results in reducing their meal intake. While it impacts various demographics, college students are particularly vulnerable to this issue. Numerous elements can result in food insecurity among students, from financial struggles that make it difficult to afford adequate meals to limited access to affordable or nutritious food options. At Colorado State University, it is essential to focus on the students facing food insecurity, as this problem is growing worse on campus, to find effective solutions.

V6 "all they want is my blood, my body, my reticence"

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Willow Engle

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Visual Art

"all they want is my blood, my body, my reticence" is designed to feel like a moment paused within time — a temporary frame in between the rising and falling, in between the melting and solidifying. Constructed from cardboard, paper and wax, this work calls upon materials that hold their volumes within space before being reshaped and modified into something new. As a queer person whose safety depended on reshaping myself for years on end, this transitory form is something I sought to harness and explore for myself. The queer body is a vessel that constantly shapes and reshapes itself. To be queer is to change, to grow, to mold a space for yourself in every space you exist within. Every word, every mannerism and every action is predicated upon accepting the danger of being; for many — including me — that willingness to accept is fading. Each day brings worse news for the future of queer people. The wax forms we constructed for ourselves are being melted for us. Our blood is being spilled, our bodies are up for debate and our reticence is returning.

F3 Twelve Little Tales Promotional Video

Emily Fiala

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FILM

This film highlights Twelve Little Tales, a small shop in Fort Collins, CO that creates storytelling and creative writing tools for children. Our team worked with Marna Widom, the owner of Twelve Little Tales, last year and created some beautiful videos for her business. She wanted us to capture the essence of her products and what they offer for young kids who want to find creativity in writing and drawing.

O7 Impacts of Forest Thinning on Regeneration and Species Dispersal in the Southern Rockies

Lance Goodman

Jason Sibold

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Oral Presentation

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Forest management techniques such as various forms of thinning, specifically in the Southern Rockies (Southern Wyoming to northern New Mexico), are widely implemented to influence forest structure to reduce wildfire and manage regeneration rates. These management techniques are not well understood in their long term effects on forest structure and ecosystems especially when considering climate change. Forest regeneration is important for the long term health and ecosystem services a forest provides. A lack of forest regeneration can lead to diminishing groundwater quality, soil erosion, and drought. Understanding the impacts of forest management techniques can help guide better and more sustainable practices for the future. Grounded in disturbance ecology theory, our study investigates whether forest treatments influence regeneration by altering resource availability, and how these effects are mediated by microclimatic variability and topographic features. Using a paired-plot design, we compare regeneration in treated (thinned) and untreated forest plots with similar characteristics across the Southern Rockies. We combined these factors along with site characteristics and moisture indices using boosted regression trees to analyze patterns of regeneration. Based on these variables and disturbance ecology, we hypothesize that treated plots will have more regeneration than their untreated counterparts.

R65 African American IDM Lesson Plans

Ryan Hansen

College of Liberal Arts

Research Poster

Throughout our nation's history, African Americans have received inadequate attention in the curriculum and unfair treatment in schools. We see the irreducible need in teaching Black History because of the ample, more accurate understanding of history, and the ameliorated future that can be carved out because of which. The purpose of this research was to evaluate a multitude of African American History Inquiry Design Model (IDM) lesson plans. The IDM format claims to assist teachers in crafting lessons and units that engage students in investigating compelling questions, analyzing sources, and developing evidence-based arguments. Given the unique and complicated history of Black people in the United States, it is imperative that African American History is taught through a record of Black agency and advancement. To that end, the 36 African American History IDM lessons are analyzed using Black Historical Consciousness (King, 2020) as a theoretical framing. With our research, we hope to contribute to the improvement of the teaching, learning and sanguine forethought as history teachers engage with African American History. Although our research is not yet complete, there's promise in the data we've analyzed so far. This work contributes to current relevant scholarship

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that seeks to address flaws in published IDM lessons and offer suggestions for improving African American IDM lesson plans.

R60 The Partisan Lens: Analyzing News Media's Role in Political Polarization Through Coverage of Trump's Initiatives Against DEI Within His First Week of Presidency in 2025

Malia Juba

Karrin Anderson

College of Liberal Arts

Research Poster

Political polarization has become entrenched in American citizens' political culture, altering how people ideologically think, associate with certain issues, and interact with the people and politics surrounding them. This literature review and case study examines how modern news media contributes to political polarization in the US through a case study on coverage of President Trump's first two weeks in office (2025). To do so, I first review existing literature surrounding the origins of political polarization, the role of contemporary media, and how political polarization exists and operates in the twenty-first century. Next, I analyze this phenomenon through two distinctly partisan news outlets and their coverage of President Trump's first two weeks in office and his early efforts to federally dismantle DEI programs. The findings of this study conclude that traditional news media's framing, language, and themes often contain partisan bias. This study contributes to the field of political communication by providing insight into the ways in which media frames political events and shapes public perception, particularly in the context of a highly contentious incident.

R62 Eocene Mammal Responses to Climate Change

Reagan Kuhn

Kimberly Nichols

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Research Poster

Haplomylus is an extinct relative of the elephant shrews (Macroscelidea) that existed during the early Eocene (56-52 Ma) in what is now central North America. This time period is characterized by the occurrence of a significant thermal event known as the Paleocene-Eocene Thermal Maximum (PETM), during which global temperatures rose rapidly then dropped, affecting climates around the world. The effects of this event are ubiquitous within the vertebrate fossil

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record, with many Eocene mammal species disappearing from the record (via migration or extinction) and others exhibiting morphological adaptations that helped them survive the changing climate. One of these adaptations is a temperature-inverse shift of Total Body Mass (TBM) - animals became smaller as temperatures increased and larger as temperatures decreased. This research examines *Haplomylus* fossil tooth specimens from the Willwood Formation in Bighorn Basin, Wyoming, as tooth size can be used to estimate TBM, and their associated geologic context. Using this data, I aim to identify if *Haplomylus* exhibited this type of shift in TBM as a result of the PETM. The results will have significant implications for the evolutionary trajectory of modern elephant shrews and will inspire future plans for conservation, as *Haplomylus*' response to climate change in the Eocene can provide an analogue for understanding the potential effects anthropogenic climate change may have on their living relatives.

R56 Exploring Storage Features at Bull Draw Shelter, Site 5MF607, Moffat County, Colorado

Ella Lang

Jason La Belle

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Research Poster

Bull Draw Shelter (5MF607) is located in a small canyon in southern Moffat County, Colorado. The Bureau of Land Management first recorded the site in 1976, noting a large vandal's pit in the interior of the shelter. Colorado State University's Laboratory of Public Archaeology followed this initial recording and undertook excavations in the shelter in both 1976 and 1977. LOPA first exposed and profiled the looted pit and then expanded horizontally to expose other areas of the shelter. They produced a draft report of the excavation in 1981, though no final report was ever completed. Recently, CSU's Center for Mountain and Plains Archaeology has revisited and remapped the site and begun systematic work with the collections in preparation for a final report. Based on LOPA's work, this large rock shelter exhibits three distinct occupation phases, including Late Archaic, Fremont, and later Ute and/or Eastern Shoshone use, and is argued to have functioned primarily as a granary and storage facility, with secondary use as a seasonal habitation. 5MF607 contains 45 features, including hearths, storage pits, and living floors. As part of the final reporting, my poster provides a thorough examination of the 5MF607 features, focusing on the contents of the storage pits and granary, in terms of floral, faunal, and cultural artifacts. My work aims to refine our understanding of the site's function and the relationship between these features and what was stored within them thousands of years ago.

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V4 Casting Slip: an Exploration of Material Knowledge

Jane Lawton

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Visual Arts

For this presentation I would like to educate visitors on my experience using casting slip in my art practice. This material is a liquid porcelain clay body that when poured into or onto plaster solidifies into a solid form in which the maker can then manipulate and fire. The plaster acts as a sponge and absorbs the water from the casting slip allowing for the liquid clay to turn into a wax-like solid form. Casting slip varies from other clay bodies in many ways. I plan to present molds, prototypes, and some finished works that showcase the process utilized to make a completed form made of casting slip. I want to discuss the expansive ways that this material can be utilized in creating both functional and sculptural works. While casting slip relies on a plaster mold to make its initial form I have mostly experimented with surface manipulation to make my finished products. The surface manipulation and design has included textured glazing, slip trailing, coloring my slip body, using slip as a 3D additive form, I have carved into casting slip, and have been using this material as a means to create sculptural pieces as well. My newest experimentation within my use of casting slip has been embracing its translucent quality and considering light as a vital aspect of casting slip as a material. Overall, I want to showcase the vast ways in which casting slip can be utilized within a ceramics practice and inspire interdisciplinary interest within this material.

V3 Material Research in Ceramics

Gabby Long, Avery McKinney, Haley Lawton, and Megan Bartholomew

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Visual Art

Our presentation showcases our material research in ceramics. This includes slip-casting and mold-making processes and color and surface design in pottery. Slip is a liquid porcelain clay body that, when poured into plaster, solidifies into a solid form, which then can be manipulated and fired. The plaster acts as a sponge and absorbs the water from the casting slip, allowing the liquid clay to turn into a wax-like solid form. The potential for surface design is endless once the form is created by the mold. The mold-making process involves casting a prototype in plaster. Depending on the object, slip-casting molds are usually made in one or more parts. Overall, we want to showcase the vast ways in which casting slip can be utilized within a ceramics practice.

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Our color and surface design research involves two main types of ceramic colorants: Mason Stains and oxides. Mason stains are fritted pigments that are stable at various temperatures and kiln atmospheres. These stains can be added to clay bodies, slips, underglazes, and glazes. Oxides in ceramics are inorganic compounds of metallic or metalloid elements bonded with oxygen. Common oxides used in ceramic glazes and slips are copper, cobalt, titanium, and iron. These colorants are used to change the melting points of glazes to create a wide range of effects on ceramic surfaces in different kiln atmospheres. Gaining the material knowledge for achieving color in ceramics is vital for planning and executing ideas in ceramics.

W4 We the People

Dylan Lorash-Neuenschwander

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Written Work

We the people – expect not you
The Black or LGBTQ
We the people – white skinned, blue eyes
Turn away from all his lies
We build our walls, we shut our doors,
Deny the pain, ignore the wars.
Your voices rise, yet go unheard,
Your love dismissed with spiteful words.
We claim this land – though it's not ours,
Stamped with blood and bruised by scars.
We take, we rule, we twist, we cheat,
And call it freedom at your feet.
We draw the lines, define the roles,
Decide who stays, control the polls.
We write the rules to fit our hands,
Then chain your dreams in stolen lands.
Yet still, you rise, unbowed, unchained,
Resist the hands that once restrained.
From embers bright, your hope is spun,
A world where love is never undone.
And though they clutch the past so tight,
The future bends toward what is right.
So We the People – all the people –

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Will rise as one, unshaken, equal.
United strong, we break the chains,
Erase the hate, erase the stains.
Together, we will build anew,
A world where justice shines through.

O8 The State of Political Literacy and the Youth

Jelicity Luna

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Oral Presentation

The rise in the utilization of social networking apps among the youth has altered the typical forms of the dissemination of information historically utilized. This advancement in technology creates a stream of continuous information, conversation, and learning. Although social networking sites may be a space for growth and the generation of new ideas, its autonomous-adjacent nature provides possibility of misinformation and harm. The potential dangers of social media mixed with an increased potential of a literacy crisis due to COVID-19-era shortfalls creates a concern for the state of democracy in the United States. This presentation seeks to further investigate the predicament of political literacy in the United States, specifically regarding youth voter turnout. Through the analysis of data from various pre-existing data including studies from the Pew Research Center and United States census, this presentation will investigate the intersection of variables such as COVID-19 impact, social media utilization, and youth voter turnout to create a report on the state of political literacy and its effect on U.S. democracy. Furthermore, this presentation serves as a call to action to a larger conversation regarding the responsibility of the state in remedying the conflicts addressed.

F2 Unveiling Sterilization: Puerto Rico's Hidden History

Jay Mario Bates Domenech

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FILM

Unveiling Sterilization is a miniature documentary about the forced and coerced sterilization in Puerto Rico during the 1930's to 1980's. It gives a basis of knowledge on one of the most under-recognized tragedies in our recent history, and focuses on one woman's story. This

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documentary should serve as an introduction to the topic, for audience members to look deeper into this event.

F5 Un Sueño Humilde

Kim Mayorga-Escalante

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Film

A story about my parents. Coming from humble beginnings, they sacrificed everything they knew to provide me with the opportunities I have today. I wanted to give back to them in a way I know best by telling their stories through film. In the film, we hear about their aspirations, goals, and the motivations that led them to immigrate to the United States. We travel back in time with them, gaining insight into who they are and what they value most in life. The footage featured in the film includes archival material they captured and videos my brother and I took during our visits to Mexico. The film's title translates to "a humble dream" which truly reflects the dream my parents held dear.

V2 Process Art Making

Avery McKinney

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Visual Arts

Showcasing process art through ceramics by providing handmade molds and different stages of porcelain wares made by the molds. Providing some glazes made by me to show surface ideas and how different bodies of clay affect the glaze inside a kiln.

R59 A Systemized Review of Nature-Based Solutions and Ecosystem-Based Adaptations in Mountain Social-Ecological Systems

Quinn Mitchell

Julia Klein and Rowena Davis

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Research Poster

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Mountain social-ecological systems (MtSES) provide critical ecosystem services, including water regulation, biodiversity conservation, and climate mitigation, yet they are increasingly threatened by climate change and governance challenges. Nature-based solutions (NBS) and Ecosystem-Based Adaptations (EBA) offer a promising approach to enhancing resilience, yet research on their effectiveness in MtSES remains limited. This study conducts a systematized review to assess the potential benefits of NBS and EBA in MtSES worldwide to enhance climate resilience and disaster reduction. Studies were screened using a keyword-driven search strategy across multiple academic databases based on predefined exclusion criteria. Data were analyzed using Excel to identify each study's population, intervention, and outcome. Suggested results indicate that NBS and EBA contribute to improved water retention, biodiversity conservation, reduced soil erosion, and strengthened community-based adaptation. The findings highlight the need for participatory governance and long-term investment in NBS and EBA initiatives. This research informs policy recommendations and supports the development of scalable, sustainable climate adaptation strategies tailored to the unique challenges of mountain regions.

R61 The Experience of Relational Entropy in Friendships

Aneka Normandie and Kate Urban

Natalierose Pennington

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Research Poster

Our poster examines how people deal with changes in closeness in friendships, building on the concept of relational entropy, which suggests that failure to maintain a relationship can lead to decay or decline. This was paired with a survey given to 238 college students about friendships that have changed in closeness over the past year. The survey asks what caused the friendship to become less close and what (if anything) could be done to restore it.

O9 Money Flows Downhill: Political-Ecological and Ecofeminist Perspectives on Ski Resorts in the Rocky Mountains

Jonah Rupe

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Oral Presentation

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Though Colorado is renowned for the quality of its skiing, its many resorts have created innumerable problems for the state's residents, wildlife, and ecosystems. Commercial ski resorts degrade their physical surroundings, exploit women and people of color, and worsen wealth inequality in their host communities. Ski hills represent the ultimate anthropocentric transformation, whereby thriving montane ecosystems and their aesthetic and ecological value are corrupted to provide entertainment and rake in profit for large corporations. Using data from the Colorado Department of Public Health and Environment, I found a strong spatial relationship between ski resorts and communities classified as Disproportionately Impacted (DI) by the Environmental Protection Agency, with over three-quarters of resorts being located within five miles of a DI community. I have chosen the Resort as my object of concern because it represents uneven development, hyperconsumerism, and environmental degradation, and because it has long loomed over Coloradans' (particularly mountain-dwellers') heads. I will be using political-ecological and ecofeminist approaches to investigate the ways in which people and the environment are exploited to maintain and reproduce ski resorts. It is my hope that the students, staff, and faculty of Colorado State University will begin to think more critically about the environmental and human cost of this mountain pastime.

C8 Estes Valley Nonprofit Economic Impact Study

Lucy Scott

Anita Pena

College of Liberal Arts

Community Engagement Poster

This study examines the economic impact of 501(c)(3) nonprofits in the Estes Valley using survey data from 56 organizations supplemented by Form 990 filings from an additional 7. The analysis shows that in the 2023 fiscal year, these nonprofits generated roughly \$103 million in revenue while incurring about \$97.1 million in expenses, indicating significant local financial activity. Nonprofits contribute nearly 10.3% to Estes Park's GDP and mobilize over 225,000 volunteer hours annually—valued at more than \$8.2 million—highlighting the vital role of community engagement. Advanced econometric analysis in R was employed to assess key revenue drivers, revealing notable multiplier effects from individual donations, government funding, and investment income. Sector-specific insights span areas such as Arts & Culture, Community & Education, Environment & Recreation, Emergency & Human Services, Health & Wellness, and Youth & Families, each presenting unique operational challenges and revenue dependencies. Despite limitations such as potential sampling bias and data variability, the study provides a robust baseline for strategic planning, donor engagement, and advocacy. This

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analysis lays the groundwork for future iterations aimed at tracking trends and informing policy decisions to bolster the dynamic role of nonprofits in sustaining local economic resilience.

R63 How do US perceptions of foreign cultures affect their perceptions of different international coalitions?

Kaitlyn Spencer, Dana Nelson, and Daniel Barclay

Meagan Todd

College of Liberal Arts

Research Poster

As our socio-political environment becomes increasingly internationally interconnected, it is more salient than ever to work to understand how we are responding to these changes. Public opinion of international coalitions can play a major role in shaping international policies, especially in democratic nations like the US, where leaders must listen to their citizens' opinions or risk removal from power. This can create dissonance if public opinion on international coalitions is shaped by their opinions of the cultures and people within these coalitions rather than on the merit and activities of the coalitions themselves. This study aims to uncover whether favorable or negative views of certain foreign cultures translate into more positive or critical stances toward international coalitions involving those nations. Understanding these connections is crucial for policymakers, diplomats, and international organizations as they navigate the complexities of global collaboration in the 21st century.

F7 Coffee, Community, and Survival: How Northern Colorado's Alexander Mountain Fire Affected Small Businesses

Maren Unwin

College of Liberal Arts

FILM

Small Business owner Christine Williams recalls what it was like to live and work in close proximity to the Alexander Mountain Fire in July of 2024

W5 Running Quite Quickly Through This House of Gladness

Stella Van Buskirk

College of Liberal Arts

College of Liberal Arts

Written Work

Everything I write is true. The truth: that's where the pieces in "Running Quite Quickly Through This House of Gladness" began. To fully understand how I curated these pieces, one must first understand why I write. Phoebe Waller-Bridge posits, "[It is] better to feel the pain of writing than the pain of not writing." I share her sentiment and will go even further by suggesting that writing is a necessity. Like most artists, I am absorbed by my art. The pieces in this portfolio were created out of need and passion. My works explore the teenage experience. Specifically, I wrote about my mental health struggle with acne, unrequited feelings for a boy, desire to understand my place in society, and the choice to love myself despite these frustrations. In many ways, my portfolio is a story of self-discovery and acceptance at seventeen years old. This is what it means to be a teenager. It's hard and complicated and you overthink a lot, but this period of growth is also a metamorphosis. It is important to note that the teenage experience is synonymous with the human experience. Though I wrote these pieces for myself, to understand my thoughts and feelings when I was otherwise unable, the beauty of literature is often attributed to its universality. If my readers can connect with any of the ideas woven throughout my writing, then I am beyond satisfied.

F9 Take One

Emerson Weiler, Max Allan, Justin Simental, Addie Willingham, and Nina Miller

College of Liberal Arts

FILM

Take One is a short horror film that follows a young man being haunted by a strange Halloween decoration.

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R124 Expansion of DNA Sequence-Structure Map by X-Ray Crystallography of Self-Complementary Sequence d(CCCCTAGGGG)

Sarah Abercrombie

Pui Ho

College of Natural Sciences

Research Poster

DNA is a polymorphic molecule capable of adopting various forms depending on its sequence. Mapping sequence and form in a systematic manner would be beneficial for understanding how sequence impacts structure and being able to predict specific locations of DNA forms within the genome. The ability to make these predictions would offer insights into how DNA structure regulates processes like replication and transcription. Previous studies have shown the inverted repeat sequence motif d(CCnnnN6N7N8GG), where N6, N7, and N8 can represent any of the four nucleotides, serves as a scaffold for determining the form and structure of all 64 unique possible trinucleotides. One unsolved N6N7N8 trinucleotide is AGG. AGG crystallized under conditions consistent with B-form DNA, resulting in a crystal with a unit cell of 44.64Å x 44.64Å x 76.38Å and a space group of P41212. The structure of the asymmetric unit, solved using molecular replacement, consists of a duplex and a single strand of DNA. Both the duplex and single strand, along with the symmetry mate, are A-form DNA. Comparison of N6GG sequences to AGG showed similar helical parameter values, indicating that A-DNA is overall conformationally consistent. An AGN8 comparison showed AGG had a significant deviation of the amount base steps are slid out, inclined, and positioned away from the center of the helix. This suggests that the G positioned at N8 had global effects on the structure of the helix. This sequence exemplifies how trinucleotide sequence influences structure and the potential structural variation depending on the nucleotide combination.

R140 DNA Damage: The Role Enzymes Play in Deaminated Base Repair

Rayia Adams

Thomas Santangelo

College of Natural Sciences

Research Poster

DNA is an essential part of every living organism and encodes information essential for cell survival. DNA can be damaged, and if left unresolved, can lead to genetic mutations resulting in altered protein structure and function. Cells encode enzymes that resolve many types of DNA

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damage. A common type of damage is spontaneous deamination of DNA bases, which changes the canonical base deoxyadenosine (dA), to a toxic analog deoxyinosine (dI). If dI is incorporated into the DNA of a cell, it can cause mutations resulting in cell death.

Thermococcus kodakarensis (Tko) is an archaeal organism that thrives at high temperatures, which result in increased rates of deamination, making it a great model organism for us to study. Tko encodes for four enzymes that are involved in deaminated base repair. We have generated strains lacking all four of these enzymes in every possible combination and have determined fitness impacts. We aim to understand more about these enzymes by analyzing the amount of dI incorporation by the use of qualitative and quantitative biological tools, and classical enzyme kinetics to analyze specific enzyme characteristics. Archaeal organisms, like Tko, are precursors to eukaryotic organisms, and can reveal links between domains of life. By understanding our enzymes of interest in Tko, we can understand more about homologous enzymes in humans. This work will lead to further understanding of the relationship between DNA repair components and the role these components play in differing domains of life.

R151 Zero Waste, Zero Hunger

Saad Ali

College of Natural Sciences

Research Poster

My objective is to implement different strategies to reduce food waste in schools and redistribute surplus foods to support students in need. Food waste is a global issue, with 1.3 billion tons of food lost or wasted annually. (UNEP) In the US, schools contribute a significant amount to food waste with 27% to 53% of food served in cafeterias being thrown away. (Nevada Independent). This waste could instead support students facing food insecurity or struggle to get a meal outside of school and can reduce hunger along as minimizing environmental issues. To reduce food waste, I will be talking with schools and discussing strategies and gaining support for implementing solutions. I will partner with local organizations like food banks and donate surplus meals. I will also conduct food waste audits that monitor the impact of my initiative and ensure that students are being fed! If successful, this project could become a framework or model for other schools and demonstrate that reducing food waste can not only help the environment but can also assist those that are in need. Scaling this initiative can create positive change in schools and communities.

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R143 Journeys of Women of Color in STEM

Aaliyah Aragon and Bethel Yeboah

Victor Kasper

College of Natural Sciences

Research Poster

In this exploratory qualitative study, we examine the journeys of women of color in STEM through counterstories. Scholarship has identified how women and people of color continue to be marginalized and underrepresented in STEM. Our focus is on counterstories, which are narratives highlighting the perspectives and points of view often outside of the mainstream, including of women and people of color. Using intersectionality as our lens, we coded data from semi-structured interviews with two women of color in STEM fields at different points in their careers. Early findings reveal a lack of cultural awareness, limited support from mentors, and barriers. Our study supports the field understanding of the barriers women of color in STEM spaces successfully navigate to reach their academic and professional goals. Additionally, our study highlights areas in STEM where women and people of color feel comfortable being themselves.

R111 The Influence of Monensin on In Vivo Rumen Fermentation Characteristics in Fistulated Steers Fed Corn Stalk Diet

Zachary Araujo-Lovato

Huey Yi Loh and Terry Engle

College of Natural Sciences

Research Poster

Sixteen individually fed steers fitted with ruminal cannulae were used in a randomized block design to examine the impact of monensin supplementation on in vivo rumen fermentation characteristics while being fed a low-quality cornstalk based diet (4.2% CP). Prior to beginning the experiment, all steers received the basal diet for 21 d. Steers were then blocked by body weight and randomly assigned to one of two treatments. Treatments consisted of: 1) Control (no added monensin; carrier only) or 2) Monensin (250 mg·steer⁻¹·day⁻¹). Treatments were administered daily, directly into the rumen via the cannula as a single bolus dose at the time of feeding over a 21d period. The carrier for treatments delivered consisted of 250 g of dried distillers grains for both treatments. Rumen contents were sampled two h post-feeding daily

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and analyzed for short chain fatty acids (SCFA). Animal was considered the experimental unit, and data were analyzed as a randomized complete block design using Proc Mixed procedures in SAS. There were no treatment by time interactions for any of the response variables measured. Therefore, only treatment main effects are reported. In vivo molar proportions of propionic acid and total SCFA (mM) were greater ($P < 0.05$) in rumen fluid from steers receiving monensin compared to controls. Molar proportions of acetic acid were lesser ($P < 0.05$) in treated than steers not receiving monensin. Molar proportions of isobutyrate and butyrate and pH were similar across treatments. These data indicate that the monensin alters in vivo rumen fermentation characteristics.

F10 Community in the Fort Collins Running Club

Tristin Astbury

College of Natural Sciences and the College of Liberal Arts

Film

A mini-documentary showcasing the community of the Fort Collins Running Club

O16 Intro to Modular Forms

Andrea Bernardy

Sandra Dileep Nair

College of Natural Sciences

Oral Presentation

Modular forms have been at the forefront of some of the most interesting projects in mathematics in the last century. These forms are holomorphic functions that map from the upper half of the complex plane to the full complex plane by satisfying the modularity condition for $SL_2(\mathbb{Z})$ where $SL_2(\mathbb{Z})$ is the set of all 2×2 matrices with integer entries and determinant of one. S and T (and their inverses) in $SL_2(\mathbb{Z})$ are the generating matrices of the modular group $SL_2(\mathbb{Z})$ that allow for a function to be mapped from the Fundamental Domain of $SL_2(\mathbb{Z})$ in the upper half of the complex plane to the full upper half of the complex plane. This provides an inordinate amount of information about the function and objects surrounding it that has led to the famous proof of Fermat's Last Theorem by Andrew Wiles as well as the Taniyama-Shimura Conjecture. These special functions have found a comfortable home in group theory with

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Moonshine Theory proposing a connection between these and the mythical Monster group and at the helm of the “grand unified theory of mathematics”, Langlands Program, which seeks to bridge algebraic number theory, representation theory, and geometry.

R138 Establishing the activities of archaeal DNA Polymerases B and D in vivo

Marina Black

Thomas Santangelo

College of Natural Sciences

Research Poster

Each Domain encodes for a unique family of DNA polymerase that serves as the main replicative polymerase; Eukarya use Pol B enzymes, Bacteria use Pol C enzymes, and most Archaea utilize Pol D enzymes. The retention of a dispensable Pol B DNA polymerase in most archaeal clades argues that Pol D and Pol B have specialized roles in vivo. While Pol B and Pol D have been characterized in vitro, the roles for each in vivo remain enigmatic. Here we describe on-going efforts to define the in vivo function(s) of archaeal DNA polymerases using the model species *Thermococcus kodakaerensis*. Strains encoding DNA polymerases with amino acid substitutions within the “steric gate” of the active center of DNA polymerases that reduce capacity to discriminate between ribo- and deoxyribo-nucleotide triphosphates have been constructed and provide a mechanism to track DNA polymerase activities in vivo. Coupling steric gate versions of pol D and pol B with Rare Damage and Repair sequencing (RADAR-seq) permits us to correlate the increase of rNTP incorporations in the genome with the activity of the mutated DNA polymerase. We will report on strain construction and phenotypes resultant from introduction of DNA polymerase variants as well as the distribution of activities of Pol B and Pol D in vivo.

R120 Quantifying The Prevalence of Water-Borne Pathogens and Comparing Water Quality With Local Sanitation Standards and Livestock Practices

Colten Blake

Meenakshi Santra

College of Natural Sciences

Research Poster

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This research project analyzes data from water samples, scientific investigations, academic articles, and public service announcements to explore the severity of the lack of clean water access and the prevalence of un-avoidable diseases which are contracted by making contact with pathogens in water sources and bodies of water around the globe. This problem is a result of both urban crowding and geographical locations of livestock and livestock crowding.

R105 Severe acute malnutrition treatment with and without rice bran supplementation revealed differences in dried blood spot (DBS) amino acid metabolites relevant to cognitive development of Indonesian children aged 6-59 months

Emma Bovaird and Annika Weber

Elizabeth Ryan

College of Natural Sciences

Research Poster

Rice bran (RB) contains unique amino acids (AA) and is an affordable, local food ingredient under-utilized for human nutrition. This study aims to determine the impact of including 5% RB in a malnutrition treatment, ready-to-use-therapeutic foods (RUTFs), on AA metabolism using dried blood spot (DBS) metabolomics. In a double-blinded, randomized controlled clinical trial 200 Indonesian children with uncomplicated acute malnutrition were stratified by age, 6-23 mo (n=78) and 24-59 mo (n=122), for DBS metabolic profiling. Participants consumed control RUTFs (n=95) or RUTFs containing 5% RB (n=105). 82 control and 75 RB participants successfully completed 8 treatment weeks and data collection to week 16. In the 6-23 mo group, metabolite profiling revealed the control arm had 21 more statistically significant AA metabolite increases over the treatment period than in the RB arm, while in the older group the RB arm saw 45 more increases than the control arm over the same period. RB had a clear modulating effect only on the 24-59 mo participants' amino acid metabolite abundances, with tryptophan and kynurenine metabolites seen to increase with RB consumption. Overall, the 5% RB RUTF's modulation of specific AA metabolite pathways suggests the local ingredient's potential to support the abundance of cognitive development-associated metabolites in children aged 24-59 mo. The study was supported by the Thrasher Research Fund and The National Institute of Health (R21HD113211, Ryan).

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R112 A Longitudinal Analysis of Parental Alienation in Canadian Court Cases: Behavioral Patterns and Family Dynamics

McKenzie Burridge

Jennifer Harman

College of Natural Sciences

Research Poster

Parental alienation (PA) is an outcome of a coercively controlling family dynamic when one abusive parent engages in behaviors (parental alienating behaviors, PABs) intended to damage the relationship between the other parent and their child. These PABs include emotional abuse, coercion, and manipulation. While PA has been examined in various contexts, this project is the first longitudinal study to use archival data from Canadian court cases to explore the evolution of PA behaviors and mental health/legal interventions and their impact on child-parent relationships. Therefore, the primary purpose of the current study is to examine PABs used by parents and other family members over time to examine their impact on children, and whether particular legal and mental health interventions are efficacious in remedying the problem. Coders who are blind to the study's hypotheses are extracting variables of interest from trial level court decisions involving families who have had at least three or more decisions made. This data will be analyzed to identify patterns of coercion and control, intervention efficacy, and overall impact on family relationships. This research fills a gap by providing the first longitudinal evidence of PA behaviors in legal settings. The findings are expected to inform legal, psychological, and therapeutic interventions, offering insights into the progression of alienating behaviors and their impact on family well-being.

R78 Dwarfing Plants through the Genetic Manipulation of GA Signaling Pathways

Liz Carlsen

Arjun Khakhar and Tawni Bull

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Research Poster

I am working under a project named The Molecular Bonsai, which seeks to create inducible systems in plants to artificially increase their root size while decreasing stem size. This should lead to them being more drought resistant, and in turn more resistant to climate change. Previously my lab directly activated a 'growth suppression protein' called DELLA in order to get

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a dwarfed plant, but a new modelling system predicted a larger effect with GID1 repression than with DELLA activation. We have already seen some root dwarfing in GID1 repression concurrent with the expression of our added genetic material, so this appears to be a fruitful line of experimentation. I am currently building three different plasmids containing different guide RNAs, a GA biosensor, some Cas9, and a repressor using modular cloning. This will target an enzyme called GA20ox which is vital for the biosynthesis of GA. Specifically, the GA20ox gene will be repressed by having Cas9 and a repressor bound to it, preventing the binding of DNA polymerase and therefore preventing transcription of the gene. Less GA means there are fewer GID1-GA complexes, and because GID1-GA complexes degrade DELLA, should lead to an increased concentration of DELLA, which would theoretically then dwarf plant growth. If this project works, it could be used in the Molecular Bonsai project for a more effective dwarfing of part of a plant, and hopefully go on to create crops that have resilience to climate change.

R126 Evaluating Publicly Available Satellite Data for County-Level Winter Wheat Productivity Prediction Using Machine Learning

Sofia Catalan

Sangmi Pallickara

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Research Poster

The growing disparity between rapid population growth and stagnating agricultural productivity poses a significant threat to global food security. In response to this challenge, various methods to increase crop productivity have been explored. Among these efforts are traditional forecasting methods; however, these approaches require substantial manpower and material resources. As a result, crop productivity estimation using remote sensing technology has become a research priority in agriculture due to its efficiency, cost-effectiveness, and minimal fieldwork requirements. This study focuses on estimating winter wheat yield at the county level in the United States using publicly available remote sensing data. Spectral, weather, and soil variables were collected at varying time intervals to assess the most effective temporal resolution for yield estimation. A convolutional neural network (CNN) was implemented to evaluate and compare these different temporal datasets. An ablation study was conducted on the CNN, and the predictive performance of each dataset was assessed using MAPE and RMSE. The performance of the proposed CNN was compared against a CNN from a different study, and the method providing the best estimate of winter wheat yield was identified. The results showed that the CNN model using 10 years of monthly data with 10 input features provided the most accurate winter wheat yield estimate, achieving an RMSE of 581.24 kg/ha and a MAPE of

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12.34%. These findings underscore the potential of integrating remote sensing with machine learning techniques to accurately forecast crop yield and support the overarching goal of achieving food security.

R107 Evaluating a Computer Vision Enhancement of the Millikan Oil-Drop Experiment

Caleb Christian

Ethan Seefried and Nathaniel Blanchard

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Research Poster

The Millikan oil-drop experiment has long been a key component of physics education, illustrating the quantization of electric charge through detailed measurement. However, its conventional implementation continues to rely on outdated tools, manual data collection, and physical apparatus, all of which introduce inefficiencies, increase error potential, and raise costs. This paper presents the Millikan Automated System for Education (M.A.S.E.), which integrates Computer Vision (CV) and Human-Computer Interaction (HCI) principles with the MillikanCV dataset to provide an alternative approach. A user study was conducted to compare traditional methods with M.A.S.E., evaluating usability using the Usability Metric for User Experience (UMUX), accuracy by deviation from the known value of the elementary charge (e), and efficiency by time required to analyze a single droplet. Results from Wilcoxon Signed-Rank Tests indicated improvements across all measures, with effect sizes of $r = 0.86$ for usability, $r = -0.84$ for accuracy, and $r = -0.88$ for efficiency. The M.A.S.E. tool and MillikanCV dataset are available publicly at <https://github.com/Blanchard-lab/MillikanCV/tree/main>.

O14 Microbial Transplant through Legume Green Manure to Promote Wheat Growth

Benjamin Collins

Jorge Vivanco

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Oral Presentation

Microbial legacy refers to the state of the rhizosphere composition over time, with factors such as nutrient availability, planting density of primary plants, and growth requirements for successor plants impacting the microbial community. Past research confirms that microbial

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legacy changes over time, with the successor plant having notable impact. Rhizodeposits have been confirmed to leave plant-available nutrients, but there is a gap in research on how rhizodeposits and the decomposition of biomass together contribute to microbial legacy with legumes succeeded by wheat plants. In this study, we set out to understand how this community changes during succession from legumes to non-legumes, and how these changes are represented in plant biomass. Legumes were planted in differing densities, then culled and replanted with wheat using the same soil and pot to ensure minimal disturbance to the microbial community. Legume root and shoot biomass were reincorporated in some degree or removed completely to assess nitrogen presence, which was determined by biomass analysis (ANOVA) of wheat plants. Biomass analysis of shoot data confirmed significant differences between all treatment groups, with root data showing a lower degree of significance between groups. Rhizosphere soil was collected and sent for sequencing to confirm the actual changes to the microbial community.

R103 Childhood Maltreatment, White Matter Integrity, and Substance Use in Early Adulthood

Zara Collins, Lydia Jacobs, Melissa Hansen, & Michael Thomas

Emily Merz

College of Natural Sciences

Research Poster

Exposure to childhood maltreatment (e.g., abuse, neglect) has been found to increase risk for substance abuse in early adulthood (Downey & Crummy, 2021), and may alter neural circuitry involved in addiction. Magnetic resonance imaging (MRI) studies reveal that maturation of white matter (WM), composed primarily of myelinated axons, may be disrupted following exposure to childhood adversity (He et al., 2023). However, the associations among childhood maltreatment, WM integrity, and later substance abuse remain unclear (Shin et al., 2018). In this study, we examine how childhood maltreatment may influence WM integrity and substance abuse in emerging adults. Participants were 18–19-year-olds (N=73, 52% female) from diverse socioeconomic backgrounds. They completed the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 2003), the PROMIS: Severity of Substance Use (PROMIS-SSU) questionnaire (Pilkonis et al., 2015) and underwent MRI scanning. Childhood maltreatment was measured as cumulative maltreatment endorsements through age 18, and substance use severity was based on PROMIS-SSU responses regarding the past 30 days. WM integrity was measured via fractional anisotropy (FA) using diffusion tensor imaging. Regression analyses run in R examined the associations among childhood maltreatment, WM integrity, and

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later substance use severity, controlling for age, sex, parental education, and ethnicity. Greater exposure to childhood maltreatment was significantly associated with increased substance use severity ($\beta = .38$, $p = .04$). Forthcoming analyses assess whether altered WM integrity mediates this association. Findings will increase understanding of how early life experiences like childhood maltreatment may impact substance use, potentially mediated by associated neural adaptations.

R117 Primate-Lizard Interaction During Early Eocene Climate Change

Sami Conca

Kimberly Nichols

College of Natural Sciences

Research Poster

Fossil glyptosaurine (Glyptosaurinae) lizards, particularly in the genus *Xestops*, are fairly rare in North America. They have recently been found in the early Eocene (~56 Ma), providing evidence of environmental change and predation. Here I report on fossil lizards obtained from the Willwood Formation (~56-53 Ma) in the Bighorn Basin, Wyoming. The early Eocene was a time of rapid environmental warming that attracted novel fauna, including glyptosaurines, whose presence is evidenced by fossils and marked by a unique set of adaptations, coinciding with the appearance of certain mammalian predators. Among the early Eocene lizards is a fossil glyptosaurine maxilla (EPV.68694) recovered in 2015 by the CSU Department of Anthropology & Geology Field School (ANTH 470). This unusual specimen is the subject of taxonomic debate. Its preserved dermal scutes exhibit pustulation -- a characteristic associated with the Glyptosaurinae genus *Xestops*. Based on anatomical features, I provide my hypotheses regarding the phylogeny of this fossil lizard, as well as its relation to the changing climate and primate predators.

R75 Developing Sentinel Plants: Using a Ribozyme System for Early Viral Detection

Josh Conlin

Arjun Khakhar

College of Natural Sciences

Research Poster

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Early detection of plant viral infections is vital for effective disease management and crop protection. This study aims to engineer a plant-based visual reporter system that activates a red pigmentation signal upon detection of Potato Virus X (PVX) infection. The system utilizes the Ribozyme-Enabled Detection of RNA (RENDER) mechanism to sense PVX-specific RNA sequences, triggering the expression of the RUBY reporter gene. The RUBY reporter gene is a synthetic construct comprising three key enzymes, CYP76AD1, DODA, and glucosyltransferase, arranged in a single open reading frame separated by self-cleaving 2A peptides. This design ensures coordinated expression of all enzymes necessary for betalain pigment production from native tyrosine, producing a visible red color and facilitating non-invasive visual monitoring without the need for external substrates or specialized equipment. To construct the PVX-responsive system, the RUBY gene was placed under the control of a promoter activated by the RENDER mechanism upon recognition of PVX RNA. First, transient experiments were performed, then transgenic *Nicotiana benthamiana* plants will be generated to harbor this construct. Upon PVX infection, the RENDER system is designed to detect the viral RNA, leading to the activation of RUBY expression and subsequent red pigmentation in the infected tissues. Through the use of sentinel plants, this visual reporter system should offer a rapid and cost-effective method for early detection of viral infections in field settings, enhancing disease management strategies and potentially reducing crop losses due to viral pathogens.

R129 Rewiring Microbial Electron Flux to Enhance Biohydrogen Production

David Crosby

Sere Williams and Thomas Santangelo

College of Natural Sciences

Research Poster

Microbial metabolism stands as a cornerstone of biotechnological innovation, offering a myriad of opportunities for sustainable bioproduct generation. *Thermococcus kodakarensis*, a hyperthermophilic archaeon, thrives in anaerobic conditions and often uses protons as terminal electron acceptors, producing hydrogen gas (H_2) as a metabolic byproduct. Hydrogen metabolism is key to microbial bioenergy, as H_2 serves as a clean, renewable fuel source. Electron flux in *T. kodakarensis* is primarily mediated by three ferredoxins (Fd1-3), each interacting with distinct electron donors and electron acceptors. Prior research suggests that only one Fd, Fd-3, naturally supplies electrons to the membrane-bound hydrogenase (MBH) for H_2 production. Enhancing electron flow to MBH via alternative Fds could increase biohydrogen output. To investigate this, we engineered strains where different Fds were tethered to MBH subunits. We expect these strains to redirect electron flux toward MBH, thereby enhancing H_2

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yield. We assessed growth rates and H₂ output across these modified strains. Evidence suggests that *T. kodakarensis* can utilize alternative Fds for making H₂, and produce more biohydrogen per cell. Understanding native pathways of electron flux and the capacity to redirect electrons towards H₂ provides insights applicable to broader bioproduct generation strategies and pushes research one step closer to solving the global energy crisis.

R122 Two Hits, One Fibrosis: IL-22 and IL-24 Mediated Repair in Agricultural Dust-Exacerbated Pulmonary Fibrosis

Ashley DeBie

Melea Barahona and Tara Gries

College of Natural Sciences

Research poster

Inhaled toxicants are recognized as major contributors to lung inflammation and tissue damage. Repair mechanisms within the lung epithelial barrier help maintain tissue homeostasis and protect against injury. The epithelial-to-mesenchymal transition (EMT) enables cells to gain proliferative abilities, and influences cancer formation and metastasis. Inhalation of dust further exacerbates this process. Additionally, in cellular immunity, macrophages release cytokines to regulate inflammation and recruit other immune cells in response to foreign insults. While Interleukin-10 (IL-10) is well known for its role in anti-inflammatory responses, other multifunctional IL-10 family cytokines, IL-24 and IL-22 are less well studied, despite their involvement in mediating lung inflammation and the EMT-MET repair process. Elevations of these cytokines have been observed in various lung diseases, such as pulmonary fibrosis (PF), chronic obstructive pulmonary disease (COPD), and lung cancer. To explore the roles of IL-22 and IL-24 further, we developed a two-hit murine model combining agricultural dust exposure (ADE) with bleomycin-induced PF.

R127 Newcomer safety: What is the role of organizational support and self-determination theory?

Emmalee Diederichs & Victoria Santana

Rosalyn Stoa

College of Natural Sciences

Research Poster

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When new employees (i.e., newcomers) enter an organization, they are likely to experience poor well-being, including stressors, anxiety, confusion, and awkwardness (Slaughter & Zickar, 2006) in addition to being at an increased risk of injury and illness (Bena et al., 2013).

Newcomers assimilate into their roles and the organization's culture through socialization (Bauer & Erdogan, 2011). Socialization can be structured (institutionalized) or autonomous (individualized) (Jones, 1986), with structured tactics linked to reduced uncertainty, greater efficacy, and job satisfaction. Historically, research has stressed the importance of socializing newcomers into safety practices. For instance, 40% of all workplace injuries involve employees with less than a year on the job (BLS, 2021). However, the specific impact of socialization on workplace safety outcomes remains underexplored. This research utilizes self-determination theory to explain the relationship between newcomer socialization and adjustment.

Furthermore, this study examines organizational support as a moderator between socialization and need satisfaction. Our findings demonstrate that perceived organizational support positively predicted safety voice, perceived safety knowledge, and perceived knowledge of safety policies. POS was only a significant moderator for the relationship between institutionalized socialization and perceived knowledge of safety policies. Additionally, need satisfaction partially mediated the relationship between institutionalized socialization and safety voice and perceived safety knowledge but not perceived knowledge of safety policies. Thus, organizational support benefits newcomers' perceived knowledge and attitudes toward safety. Managers should prioritize creating structured onboarding procedures that build newcomer autonomy, competence, and relatedness to increase safety knowledge and attitudes.

R104 Minimum Sequence Requirements of Prion Like Domains in Yeast for Stress Granule Localization

Alessandra Donev

Eric Ross

College of Natural Sciences

Research Poster

In response to cellular stress such as pH or temperature changes cells can rapidly form cytoplasmic assemblies called stress granules. Stress granules are complex, reversible ribonucleoprotein assemblies that form by liquid-liquid-phase separation – a process whereby a solution separates into two distinct liquids. Interestingly, many of the proteins found in stress granules contain prion-like domains (PrLD), which are protein segments that resemble yeast prion domains. Various PrLDs are sufficient for stress granule localization. Our lab is, therefore, examining the sequence features of PrLDs that promote localization to stress granules. In this

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project, we performed truncations on the N and C terminus on two synthetic PrLDs to define the minimum amino acid sequence length required for stress granule localization. One synthetic domain could be truncated down to as small as 40 amino acids, while in another domain, recruitment to SGs was evident with domains as small as 20 and 30 amino. A variation was seen in the truncations based on where the protein was truncated, demonstrating a preference for specific compositional features. These findings suggest that both sequence length and compositional properties influence the capacity of PrLDs to localize to stress granules.

R98 Evaluation of Coral Health in Baja California Sur, Mexico

Caroline Driskell, Avery Kruger, Leah Hasstedt, & Magnolia Baroli

Diane Wright

College of Natural Sciences

Research Poster

Coral reefs are ecologically and economically important ecosystems that have declined as a result of many anthropogenic stressors. Coral habitats are a hotspot of biodiversity and home to many organisms, to which bleaching and destruction are an imminent threat. Our study investigates whether differences in water quality, using dissolved oxygen levels as a measurement contributing to coral health. We compared dissolved oxygen content in healthy and unhealthy regions of a coral reef by collecting water samples from shallow, medium, and deep depths in each region. Using a Dissolved Oxygen Analyzer and CTD instrument, we measured dissolved oxygen, depth, temperature, and salinity. Sampling was repeated twice over two days. The health of the sampled reef regions was determined by using the University of Queensland Coral Health Chart. No significant statistical difference was found between the test areas. We suggest future research should be done in a controlled lab environment and not in the open ocean where differences could be hidden by the constant movement of water.

R81 When do Journalists Report Effect Sizes?

Justin Eldridge

Benjamin Prytherch

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Research Poster

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We have all read articles like "New Study Finds that Eating Carrots Reduces the Risk of Heart Disease" where the author fails to answer the all-important question: "By How Much?" We wanted to learn more about how the results of scientific studies are communicated to mass, non-technical audiences. We collected a series of articles from five major news publications and recorded whether the effect size or direction was contained in the article. We also noted if the original study was linked in the article and whether or not effect size information was available in the original study. We found that almost all publications are guilty of leaving out effect sizes, and some were conspicuously reluctant to include details about the original study.

R96 Improved glioblastoma anticancer agents: combining vanadium with phosphonium containing Schiff bases

Connor Elkin

Debbie Crans & Skyler Markham

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Development of therapeutics for difficult to treat or aggressive cancers, such as brain or pancreatic cancers, are of increasing interest to scientists. Our groups' current focus is on glioblastoma (aggressive brain cancer) by synthesizing short-lived metal-based complexes for potential future applications as intra-tumoral injectable agents^{1,2}. In this poster, a new class of Schiff bases ligands containing a phosphonium group will be synthesized and investigated. Recent work in the Crans group have developed several potent non-innocent vanadium Schiff-base catecholate complexes, most notably the lead compound being twelve times more active than cis-platin, the most commonly used metal-based anticancer therapeutic.^{1,2} However, these complexes have limited stability and the mechanism of action for inhibiting cancer cell growth is still unknown. In aims to develop a more stable complex with a potential different mechanism of action, a new phosphonium Schiff base ligand is investigated that have the potential of targeting mitochondria³. Based on this concept, a phosphonium-containing ligand was designed and synthesized, its vanadium complex has been synthesized. The poster will describe the synthesis, and the characterization by multi-nuclear NMR spectroscopy as well as UV-Vis spectrophotometry. In addition, representative compounds will also have been tested for their antiproliferative effects on a Glioblastoma T98G cells.

R82 Predicting protection against tuberculosis from BCG vaccination using the guinea pig model

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Alexandra Englert, Brendan Podell, David Ackart Jr, Faye Lanni, & Lauren Hunstad

Brendan Podell

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Guinea pigs, while having been used as a model animal for tuberculosis infections for over a century, modern literature about their response to the commonly used BCG vaccination is limited. In this study, we investigated whether immune responses to the BCG vaccine are variable and if these differences could predict protection after exposure to *Mycobacterium tuberculosis*. Using the guinea pig model, the only rodent species that reliably develops delayed-type hypersensitivity responses similar to humans, we evaluated inflammation in response to BCG vaccination, tuberculin skin test (TST) response, and capacity for antigen-specific secretion of IFN γ by ELISpot in response to *M. bovis* purified protein derivative (PPD). We hypothesized that the degree of inflammation incited by BCG vaccination would correlate with TST size and frequency of antigen-specific IFN γ production. Most of the animals developed an inflammatory response to TST within 24-72 hours, indicating a Th1 response was developed post-vaccination. However, 4 out of 18 individuals lacked an inflammatory response that lasted over 24 hours. To confirm this, IFN γ production will be assessed in PBMCs isolated from BCG vaccinated and unvaccinated guinea pigs. We hypothesize that IFN γ secretion will be highest in guinea pigs with the largest TST response. The results of this study demonstrate that BCG vaccination lacks reliability in developing a delayed-type hypersensitivity response. Collectively, our results will determine if this highly variable response to BCG vaccination will confer variable protection against *M. tuberculosis* infection, thereby identifying individuals from which correlates of protection or vaccine failure may be derived.

R84 Development of an Automated Fluorescence Microscope System for Long-term Live Cell Imaging

Ziqiu Feng

Brian Geiss

College of Natural Sciences

Research Poster

Monitoring fluorescence expression in live cells is valuable for quantifying processes such as infection kinetics of viruses that express fluorescent proteins. However, manual tracking of fluorescent protein expressing viruses in live cells is time consuming, requires removal of infected cells from their optimal culture environment, is limited in the number of time-points that can be feasibly monitored, and can pose a biohazard risk if cultures need to be transported

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from their biosafety incubator to a different room for imaging. To address this issue, we are developing an incubator-housed robotic microscopy system (Incubot) that will allow infected fluorescent cells to be imaged without being removed from their cell-culture incubator. The Incubot is an embedded system designed to automatically perform imaging experiments inside of the incubator over long periods of time and aims to eliminate the need for direct human contact or transportation of live cell cultures outside of the Incubator for the duration of the experiment. The Incubot is based on a 2020 open-source project published by the Pickering Lab (University College Dublin), and we have focused on improving overall system functionality and user experience through a series of hardware upgrades and software modernization. We provide a breakdown of hardware components used to build the embedded system, software design goals and development process, and methods used to test the Incubot and its control systems.

R114 Exploring Factors that Influence In Vitro Bumble Bee Colony Success

Megan Fenner

John Mola & Laura Lukens

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Bumble bees have an annual life cycle with discrete stages that impact the development of colonies. In vitro rearing settings must capitalize on each stage to ensure the success of bumble bee colony growth and maturation, requiring conditions similar to those found in wild colonies. However, unforeseen factors can significantly impact colony rearing success, with past studies reporting success rates below 50 percent. In May 2024, colonies of two species (*Bombus huntii* and *Bombus griseocollis*) were established from wild caught queens. Each queen received pollen and nectar, with colonies maintained under optimal heat and humidity conditions. Throughout the season the colonies were meticulously monitored and maintained, and a variety of data were logged. Not all colonies successfully reared brood, and those that did exhibited variation in success metrics. Here I use data collected throughout the season and after the season to explore correlations between colony conditions and their success to better understand what factors led to successful in vitro rearing. Success was measured by the production of offspring (workers) and time to first worker production. Factors explored are initial queen body size, pollen status of incoming queens, timing of collection, and species-specific differences. Through analyzing a qualitative measure of success through a lens of quantitative measurements will we better understand factors that can improve in vitro rearing for future rearing endeavors.

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R145 A Preliminary Investigation of Gender, Anxiety, and Negative Psychological Consequences

Alexis Freudenthal & Megan Bucki, Allison Kom, Keaton Fletcher, & Vivien Crutcher

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Anxiety from speaking up in a work team can contribute to negative psychological consequences including guilt, shame, and frustration. We investigated gender as a potential moderator for the relationship between trait anxiety and the negative psychological consequences of speaking up.

R101 Characterization of TSC in Crustacea

Levi Friss

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Research Poster

For crustaceans to grow, they must go through the process of molting, a complex hormonally regulated cycle which consists of various stages and checkpoints, primarily regulated by the Y-organ (YO). Molting is divided into several stages: intermolt, the time between molts where the animal spends most of its time; pre-molt, where ecdysteroids—molting hormones—begin the processes necessary for molting; ecdysis, when the animal sheds the old exoskeleton; and post-molt, where the animal hardens the exoskeleton and return to a basal metabolic state. An important regulator of cell growth and a member of the mTOR pathway, the Tuberous Sclerosis Complex (TSC) is a large tetrameric GTPase activating protein (GAP) formed from two dimers: hamartin (TSC1) and tuberin (TSC2). TSC inhibits the GTPase rheb, an activator of mTOR, via hydrolyzing rheb bound GTP into GDP. Since many biological signals converge on TSC, it is important to understand the nature and role of TSC within the context of crustacean molting in order to understand how molting is modulated under different internal and external conditions. From the construction of phylogenetic trees and analysis of transcriptomic data, we aim to characterize TSC in crustaceans. We found that TSC1 and TSC2 are fairly well conserved in true crabs, and quantified their expression levels over the various molting stages, and that the tertiary subunit TBC1D7 is present and well conserved in crustaceans. Future studies will refine quantification methods, annotate structural domains of TSC1/2 and TBC1D7, and use gel electrophoresis to show in vivo confirmation of these protein sequences.

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R100 A Bioinformatic Examination of the Crustacean Ecdysone Receptor Complex Throughout the Molt Cycle

Olivia Garvin

Donald Mykles & Vanessa Bentley

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Research Poster

Molting is an essential process for crustaceans to grow and develop and is initiated by the increase of ecdysteroids in the hemolymph. 20-hydroxyecdysone (20E), the most active form of ecdysteroid, is produced by the pair of Y-organs (YO) or molting glands. The crustacean molt cycle is regulated upon 20E binding to the ecdysteroid receptor as it causes a downstream signaling cascade to occur that results in ecdysis. The ecdysteroid receptor is a heterodimer composed of two different proteins – ecdysone receptor (EcR) and retinoid X receptor (RXR). While it is known that EcR is expressed during the molt cycle, it is uncertain to what extent EcR is expressed across different molt stages. EcR and RXR transcripts, including the isoforms, were identified and characterized in the blackback land crab (*Gecarcinus lateralis*) YO transcriptome using phylogenetic and bioinformatic tools. Additionally, RNA-seq data of the YO was analyzed to examine differential gene expression across the different molt stages. Findings from this study will unveil the gene expression levels of various isoforms of EcR and RXR proteins across molt stages including the corresponding ecdysteroid levels. A better understanding of the ecdysteroid receptor can have significant impacts in the aquaculture and fisheries industries. Supported by NSF grants to DM (IOS-1922701) and DD (IOS-1922755).

R102 Determining the impact of vaccination on the temporal presence of prions in the blood of chronic wasting disease challenged white-tailed deer

Allison George, Amy Nalls, Candace Mathiason, Erin McNulty, & Nathaniel Denkers

Erin McNulty

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Research Poster

Chronic Wasting Disease (CWD) is the fatal neurodegenerative disease of deer, elk and moose caused by the accumulation of misfolded prion protein. We are assessing the efficacy of two vaccine candidates in the native white-tailed deer (WTD) host. One vaccine targets structure-specific surface epitopes of the misfolded prion protein to induce a protective immune

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response against prions, and the other vaccine aims to activate immune responses against the normal cellular prion protein blocking infection. Deer cohorts receiving either or both vaccines in combination remain healthy demonstrating vaccine safety. Additional deer cohorts, after receiving a vaccine prime/boost series, were orally challenged with CWD and are being monitored for CWD status and shedding profiles including the presence of prions in their blood. Infectious prions have been demonstrated in the blood of infected sheep, cattle, deer, and humans. Yet in vitro detection of blood-borne prions has been hampered by low concentration and assay inhibitors. Our established modified prion amplification assay (LIQ), detects hematogenous CWD prions. We will assess longitudinally-collected blood samples from vaccinated and challenged WTD at 3-month intervals to determine the presence of prions in blood. Findings from this study will determine the efficacy of two vaccine candidates to mitigate CWD infection and shedding, and fill knowledge gaps about the role of the immune response in CWD infection and mitigation.

R87 The Effect of Superior Hydrophobicity on Antiproliferative Vanadium(V) Complexes: Structure Activity Relationships

Avery Gibson and Debbie Crans

Christopher Chang

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Research Poster

Glioblastoma, a deadly brain cancer, is difficult to treat with conventional chemotherapy due to multi-drug resistance and the impermeability of the blood-brain barrier. Intratumoral injection allows highly localized direct administration, making it a promising treatment strategy for glioblastoma. We are exploring the properties of a class of hydrophobic non-innocent oxidovanadium(V) coordination compounds with a tridentate Schiff base ligand, which are selectively cytotoxic against human glioblastoma (T98g) and have significantly less toxic decomposition products, minimizing their systemic toxicity following intratumoral injection. Hydrophobicity, solubility, and steric bulk protect these complexes from hydrolysis, thereby improving hydrolytic stability and cellular uptake. A drug's interactions with biological systems are influenced by its structure, so the structural and conformational characterization of these compounds will be essential for designing new compounds with desired chemical and biological properties. In this study, the synthesis and properties of two new hydrophobic 3,5-di-tert-butyl substituted Schiff base vanadium(V) compounds, [VO(DTB-HSHED)(cat)] and [VO(DTB-HSHED)(DTB)], and the precursor complex [VO₂(DTB-HSHED)] are described, where HSHED = N-(salicylideneaminato)-N'-(2-hydroxyethyl)-1,2-ethanediamine, DTB = di-tert-butylcatechol, and cat = catechol. The di-tert-butyl substitutions on the Schiff base were chosen to increase

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hydrophobicity, and the unsubstituted and di-tert-butyl catechol ligands were chosen for reference and hydrophobicity, respectively. The solution structures of [VO(DTB-SHED)(DTB)] and [VO(DTB-HSHED)(cat)] are characterized using 51V and 1D and 2D 1H NMR spectroscopies, and the crystal structures of [VO(DTB-HSHED)(cat)] and [VO₂(DTB-HSHED)] are reported. [VO(DTB-HSHED)(cat)] shows good antiproliferative activity (IC₅₀ 4.8 ± 1.2 μM, 72h), and the antiproliferative activity of [VO(DTB-HSHED)(DTB)] is even greater (IC₅₀ 1.0 ± 0.4 μM, 72h). These new complexes are significantly more stable than the parent [VO(HSHED)(DTB)], which makes them an improvement on the current lead compound.

R150 ZO-1 structural presence across placental development in *Peromyscus maniculatus*

Madison Gosney

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Research Poster

The North American deer mouse, *Peromyscus maniculatus*, is rapidly emerging as a premier model organism in biology. However, there is limited data concerning the gestational physiology and determinant proteins within the species. This deficit is counterproductive in the application of the deer mouse as a model for reproductive research and for developing genetic tools in this model. To fill this gap in knowledge, the Wilsterman Lab has generated a gestational atlas that provides a qualitative and quantitative description of placentation and characterizes the dynamic expression of key proteins involved in this process. I focused on one of these key proteins, ZO-1. ZO-1 is a protein involved in forming tight junctions and changes in its expression has been used to diagnose vascular remodeling within the decidua. I found that larger vasculature in the decidua are associated with larger ZO-1-positive, vasculature-associated bands. Further investigation indicated an increase in the presence of trophoblast cells within the vascular-associated band throughout late gestation. These findings identify the presence and location of ZO-1 protein within the North American deer mouse placenta. Further research should be conducted to evaluate the function of ZO-1 at different stages within gestation as well as its presence within the junctional and labyrinth zones.

Keywords: ZO-1, gestation, decidua, vascular remodeling, *Peromyscus maniculatus*

R90 Methods for Finite Element Mesh Creation of Arbitrary Domains for use in Electrical Impedance Tomography

Ella Gravante and Jennifer Mueller

Kyler Howard

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Oral Presentation

Electrical impedance tomography (EIT) is an imaging method in which currents are applied on electrodes placed around the body, reconstructing a conductivity image. Because different tissues have different ion concentrations, electricity will flow through them differently and affect the measured voltages at other electrodes. EIT provides a bedside, real-time, non-irradiating method for clinicians to monitor patients. However, the reconstructed images are low resolution, and in order to utilize machine learning or other statistical methods to improve reconstructions, a large dataset of actual or simulated EIT data is required.

This presentation will discuss methods for creating a simulated dataset. To assess heart and lung function with EIT, we segmented chest CT scans by labeling the lungs, trachea, soft tissue, heart, esophagus, and bones. These labels are exported to GMSH, a finite element method (FEM) meshing software. It is difficult to generate meshes for non-geometric domains such as bodily tissues due to their surface complexity, which can lead to non-coincident faces and self-intersections. Care must be taken in mesh generation and python post-processing to maintain quality. Once prepared, virtual electrodes are placed, and the meshes are run through the FEM to simulate a variety of heart and lung conditions.

R90 Highs and Lows: Side Effects Following Nitrous Oxide Use

*Ella Gravante, Brady Zipter, Chandler Hand, Hollis Karoly, Isabella Packwood, & John McArthur
Cianna Piercey*

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Research Poster

Nitrous oxide (N₂O), known as laughing gas, is a commonly used anesthetic and analgesic in medical settings. However, recreational use of this compound in social spaces is increasing in the United States, as N₂O produces inexpensive and fast-acting psychoactive effects. Non-medical N₂O use has doubled in twenty years, with lifetime prevalence of use increasing from 2% in 2003 to 4.1% in 2023. While selling N₂O for consumption is illegal in the U.S., it can be marketed for culinary applications. This gray area allows N₂O to be sold at outlets such as smoke shops, online retailers, and food delivery services. These products are not regulated for consumption, and allow the administration of large quantities of N₂O via unsafe methods. To monitor adverse outcomes, we surveyed 433 users of N₂O to determine how various use patterns such as frequency, quantity, mode of administration, and co-use with other drugs impact the incidence of DSM-5 derived nitrous use disorder, peripheral neuropathy symptoms, and past-year negative substance use consequences. We have recently finished data collection

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and are in the process of performing regression analyses. It is expected that larger doses in higher frequencies will lead to increased probability of experiencing these adverse outcomes.

R118 Timescale Effects for Environmental Exposures

Allison Greening

Kayleigh Keller

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Research Poster

In the field of epidemiology, numerous studies have investigated the effects of long-term pollution exposure on adverse health conditions. However, these studies commonly use long term averages and overlook the temporal structure of pollution exposure. These timescale effects have yet to be thoroughly observed, even though neglecting these patterns may affect the accuracy of estimates of long-term health impacts. Therefore, the goal of this research was to determine whether the long-term average is an effective representation of total exposure and thus suitable for use in cohort studies of adverse health outcomes. This evaluation was achieved through a simulation which modeled a participant's cumulative exposure when placed in one of twelve polluted environments. It created a linear regression model with their long-term average as the predictor variable and versions of cumulative exposure as the response. It was found that the long-term average is indeed a useful predictor in the majority of environments. However, the input of sporadic and discontinuous exposure patterns affected the validity of this predictor, highlighting the importance of accounting for timescale effects.

R132 Investigating Cognitive Discrimination in the Domestic Rabbit: A Quantitative Approach

Madeline Gregory, and Vivian Lyday

Sophia D'Agostino

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Research Poster

Domestic rabbits (*Oryctolagus cuniculus domesticus*) remain largely understudied in cognitive research, particularly regarding their ability to discern differences between samples. This preliminary study aimed to investigate whether rabbits can recognize differences in quantities of food. The experiment involved a rabbit choosing between two equidistant trays containing differing amounts of food, with the larger portion being randomly placed on either side to avoid

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bias. A standardized procedure was followed over 42 trials with a sample size of $N=1$. Results showed that the rabbit selected the tray with the larger quantity of food 84% of the time, yielding a p -value of less than 0.05. These findings suggest that rabbits are capable of quantitative discrimination, offering valuable insights into their cognitive abilities and how they perceive their environment. This research also provides a foundation for future studies on rabbit cognition and societal behavior. A larger-scale study with additional subjects is currently underway to confirm the significance of these results, potentially leading to a broader understanding of cognitive abilities in domestic rabbits and other animals historically underrepresented in cognition research.

R116 Chilling Truth: Unveiling the Effects of Storage Temperature on the Metabolomic Profiles of Food

Macy Gruszczynski, Jacqueline Chaparro, Jessica Prenni, Margaret Read, Melanie Odenkirk
Jessica Prenni
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Research Poster

Food is a complex matrix of macronutrients, micronutrients, and secondary metabolites that influence flavor and nutritional value. Many of these molecules are sensitive to temperature, humidity, and light, which can shorten metabolite lifespans and compromise food composition analyses. For biological samples, storage at -80°C has shown minimal enzymatic activity and enhanced lipid stability. Foodomics has adopted -80°C storage for food samples without rigorous evaluation. However, maintaining -80°C freezers is costly, energy-intensive, and not feasible globally. Nine foods from eight taxonomic families were selected to evaluate the effects of storage temperature. All food samples were lyophilized and homogenized. Four aliquots of each food were stored in boxes, controlling light exposure, at four temperatures: 20°C , 4°C , -20°C , and -80°C . Two aliquots were analyzed after three months, and two after six months. Metabolites were extracted for analysis using the Periodic Table of Food Initiative (PTFI) untargeted metabolomics method. The results revealed that storage at -80°C maintained the highest stability of small molecules, consistent with its use in biological sample preservation. Significant degradation occurred in samples stored at room temperature, while intermediate stability was observed at 4°C and -20°C . Pigment degradation, particularly beta-carotene in carrots, further supported temperature effects on stability. This study suggests that while -80°C is ideal, alternative storage conditions may suffice for some metabolites.

R77 Faith Integration in Marital Satisfaction

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Claira Haagenstad and Lorann Stallones

Ashleigh Zaker

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Research Poster

This research project investigates marital satisfaction among Spirit-filled Christian couples, exploring the intersection of religious beliefs and relationship quality using the strength and strain model. Marital satisfaction is crucial for overall well-being. Low levels of marital satisfaction are associated with negative psychological and physical health effects. Within faith communities, marriage is often perceived as a spiritually significant covenant. Despite the importance of this perspective, there is a notable gap in research and literature regarding how specific religious beliefs, particularly those of Spirit-filled Christians, influence marital satisfaction. While some marital guidance and counseling is provided in church settings, some couples may not feel fully supported by their faith community. Additionally, church counseling may lack psychological knowledge demonstrated in licensed therapeutic settings that could benefit marital strength and strain. Conversely, traditional counseling settings may lack an understanding of the intersections of the Christian faith and marital satisfaction. This qualitative study utilizes semi-structured interviews with adults married for at least five years in the Christian-faith community to gather in-depth narratives about their experiences. Participants share insights into the strengths and challenges within their marriages, how faith shapes their perceptions and coping mechanisms, and the role of their faith community in navigating marital dynamics. Some of these strengths include a shared belief in the marriage being a holy covenant, mutual respect, and teamwork. Some examples of strain include differences in faith participation, parenting challenges, and trust issues. The anticipated findings aim to deepen understanding of the dual role faith plays in enhancing and challenging marital satisfaction, ultimately informing the development of culturally competent support systems that integrate spiritual and psychological resources tailored for marital strength and strain in faith-based communities. This research seeks to provide valuable insights for practitioners and community leaders, fostering healthier marriages and improved mental health outcomes within Spirit-filled Christian couples.

R89 Leaf It To Science: Exploring Use, Adverse Effects, and Harm Reduction Strategies of Kratom

Chandler Hand, Brady Zipter, Carter Bruning, Devin Henry, Hollis Karoly, Isabella Gravante, Isabella Packwood, Jessica Ruehrmund, John McArthur, Joseph Cameron, Katelyn Weldon, & William Ahern.

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Kratom is a psychoactive botanical gaining popularity in the United States; however, little is known about its potential adverse effects and harm reduction methods for consumers. This study recruited 102 patrons (mean age = 22.34 years, 32.9% women) at two ethnobotanical tea bars in Colorado. Each participant was given a survey which consisted of questions pertaining to adverse experiences regarding kratom use. Many of the participants (75.5%) reported having at least one adverse reaction to kratom in the past, with a wide-ranging dosage of kratom consumption being reported. Adverse symptoms were often linked to consuming kratom on an empty stomach, dietary factors, dehydration, and consuming with other substances. Participants reported attempting to engage in harm reduction methods to subside adverse reactions such as, drinking water, food intake, and resting. Multiple techniques and harm reduction methods have been reported to mitigate the adverse effects, yet the efficacy of said techniques is unknown due to lack of data. Further research is needed to understand the causes and repercussions of the adverse effects of kratom use and to clarify potential harm reduction methods that could be used to prevent these adverse reactions.

R74 Growth Kinetics of Bat-Associated No-Known-Vector (NKV) Flaviviruses on Arthropod-derived Cell Lines

Anna Hartwick

Anna Fagre

College of Natural Sciences

Research Poster

Flaviviruses (genus *Orthoflavivirus*, family *Flaviviridae*), representing public health threats like West Nile virus, dengue virus, and Japanese Encephalitis virus, cluster phylogenetically based on the arthropod vector that transmits them. Meanwhile, there are two clades within the genus—both termed No-Known-Vector (NKV) flaviviruses—thought to have no hematophagous arthropod vectors capable of transmitting them and lack the same degree of ecological characterization as other flaviviruses. However, some findings suggest that the vector-borne status of NKV flaviviruses should be reclassified. Viruses in one NKV flavivirus clade, closely related to the mosquito-borne Yellow Fever virus, replicate to low titers in mosquito-derived cell lines, and one of them was isolated from ticks in Kyrgyzstan. This study aims to replicate and further characterize viral growth kinetics with cell line-virus pairings guided by a genomic-based machine-learning algorithm, scientific literature, and historical data from the CDC. In this study, we obtained bat-associated NKV flaviviruses, propagated them on African green monkey

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kidney (Vero) cells, and conducted multi-step growth curves on representative vertebrate (primate, bat) and invertebrate (mosquito, tick) cell lines. Supernatant was collected at 0, 6, 12, 18, 24, 36, 48, 72, and 96 hours post infection and titered using plaque assays on Vero cells for growth curve formation. These findings will inform missing pieces of vector potential and ecology for both clades of NKV flaviviruses.

R141 Handling Missing Data in Cancer Cell Line Datasets

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Tianying Wang

College of Natural Sciences

Research Poster

Ignoring missing data is a critical issue across multiple disciplines in research such as epidemiology, bioinformatics, and climate science, and has garnered increasing attention in recent years. Ignoring this form of missingness or interpreting it as random can result in biased estimations and inaccurate statistical inferences, jeopardizing research goals. This project aims to analyze missing data from the Cancer Cell Line Encyclopedia (CCLE). Using the R programming language, a database was curated by compiling data from multiple sources. Cancer cell line variables were combined based on genetic characteristics and other omics data, followed by a data-cleansing process to ensure reliability. In this project, visual tools were developed to dimensionalize the exploration of data patterns, including the distribution of diseases across different groups and the relationships between age, gender, and cancer types. Missing values in the dataset were imputed using the k-nearest neighbors classification algorithm. Key outcomes of this work include the establishment of a unified system for organizing and analyzing data, the identification of patterns and causes of missing data (decoding NA values from zeros), and the creation of visual representations to enhance data interpretation. This research contributes to a foundation for future studies that use cell line datasets for predicting cancer cell responses to treatments in personalized medicine for cancer patients.

R97 Characterization of Ras Homolog Enriched in Brain (Rheb) Among Decapod Crustaceans

Ashley Hernandez

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Research Poster

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Molting is regulated by steroid molting hormones (ecdysteroids), produced by paired molting glands, or Y-organs (YOs). YO ecdysteroidogenesis involves the molt-inhibiting hormone (MIH) signaling control of mechanistic Target of Rapamycin Complex 1 (mTORC1)-dependent protein synthesis, as rapamycin inhibits ecdysteroid synthesis and secretion. Ras homolog enriched in brain (Rheb) is a GTP-binding protein that activates mTORC1. As Rheb is upregulated during premolt, its expression can be used as a proxy to determine the effects of molting on mTORC1 activity in the YO and other tissues. The CrusTome database was used to characterize 82 Rheb sequences across all major crustacean taxa. Phylogenetic analysis and multiple sequence alignments indicated that Rheb is highly conserved across Metazoa. Alignment of protein sequence between decapods and humans revealed nearly 100% conservation of functional motifs, including GTP-binding sites and the Guanine Nucleotide Exchange Factor (GEF) and Guanine Nucleotide Dissociation Inhibitor (GDI) interaction sites. Differential expression of Rheb across eleven tissues was analyzed through PCR and gel electrophoresis for *Gecarcinus lateralis* and *Carcinus maenas*. Rheb protein was identified using liquid chromatography/tandem mass spectrometry in the YOs of both *G. lateralis* and *C. maenas*. Effects of molting on Rheb expression in the YO will be reported. This data emphasizes the importance of Rheb in the endocrine regulation of decapod molting.

R149 Inhibition of Neural Signaling Pathways in Small Cell Lung Cancer

Kimy Hernandez-Delacruz

College of Natural Sciences

Research Poster

Treatment of small cell lung cancer (SCLC), a lethal subtype of lung cancer, has seen little progress in the last 40 years. The capacity of SCLC to acquire chemoresistance inflates its likelihood of recurring to almost certainty, making sustained treatment success rates dismal. These challenges necessitate further research into preventing SCLC from evading available treatments or finding additional options to treat the disease. Key features that differentiate SCLC from other lung cancers include the absence of functional p53 and RB1 tumor suppressors, as well as the presence of neuro-specific receptors due to the neuroendocrine origin of the tumor. This study investigated the impact of two FDA-approved migraine medications, Fosaprepitant and Rimegepant (Nurtec®), on SCLC. Fosaprepitant served as a vehicle control, while Rimegepant targets the Calcitonin Gene Related Peptide (CGRP) receptor expressed in SCLC. To evaluate the effects of these medications, we performed Alamar Blue assays, colony forming assays, qPCR, and immunofluorescence staining (IF). Alamar Blue Assays were used to assess patient-derived SCLC human cell lines' ability to proliferate in the presence

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of drug across concentrations of 0, 15, 30, 80, and 100 μM . To study if the medications had any impact on SCLC's stem-like characteristics, SCLC cell lines were treated with the drugs individually, and their ability to grow from a single cell into a colony was examined using a colony forming assay. IF staining and qPCR provided insight into CGRP receptor expression and molecular subtype switching as a result of drug treatment. While proliferation rates appear unchanged, there is potential for downstream gene expression changes. Further investigation of neural signaling inhibition on SCLC could yield benefits for patients in the future through drug repurposing.

O11 Empowering Inclusive Science Communication: Innovative Ways for Assessing Undergraduate STEM Education

Josh Hill and Delaney Worthington

Delaney Worthington

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Oral Presentation

In a changing world, science communication must move beyond traditional, top-down methods to embrace inclusivity. To create this model, STEM students need training in these strategies, yet tools to assess their communication inclusivity are lacking. To help expand inclusive science communication training, we developed a course where students explored scientific uncertainty, inclusive strategies, and emerging viral diseases through discussions and interactive lectures. Students created deliverables tailored to specific communities on infectious diseases like Dengue Fever or H1N1, using innovative formats to apply inclusive science communication principles. To assess the course's efficacy, we developed and validated a codebook to evaluate students' science communication in an upper-division virology course ($n=50$). The codebook measures deficit versus inclusive communication. Inclusive communication has three elements—Intentionality, Reciprocity, and Reflexivity—examining underrepresented voices, audience adaptation, and critical reflection. Deficit communication has two elements—Stereotypes and Knowledge Biases, and Epistemic Arrogance/Illusion of Knowledge—analyzing deficit-based strategies. Using the codebook, we analyzed students' reflections, plans, and deliverables. Preliminary findings show improvements in incorporating underrepresented voices and reflective practices. However, some outputs still reflected deficit-based approaches, such as either/or thinking and paternalism. This study demonstrates that a theory-driven, validated codebook effectively assesses and enhances inclusive science communication in undergraduate education. The framework equips educators with actionable insights to foster equitable, engaging discourse and develop students into more effective, socially conscious communicators.

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R86 Exploring the Role of Wild Armadillos in Leprosy Transmission: A Study of *M. leprae* and *M. lepromatosis* Prevalence in Florida and Texas

Joseph Himelspach, Bettina Broeckling, John Anderson, & Ritika Janapati

Charlotte Avanzi

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Research Poster

Exploring the Role of Wild Armadillos in Leprosy Transmission: A Study of *M. leprae* and *M. lepromatosis* Prevalence in Florida and Texas. Co-Authors: *Joseph Himelspach¹, *John Anderson¹, Rijika Janapati¹, William Loughry², Ramanuj Lahiri³, Timothy Brys⁴, Adele Crane¹, Tanvi Honap¹, Bettina Broeckling¹, Charlotte Avanzi¹. *Mycobacterium leprae* and *M. lepromatosis* cause leprosy, a disease still prevalent in the U.S. with around 177 new cases reported annually. Approximately 15% of cases are believed to be zoonotically acquired from the Mexican Long Nosed Armadillo, though the exact mechanism of infection is unknown. We hypothesize that animals shed bacteria through their nasal or fecal cavities, correlating with infection levels. This study investigated the prevalence of *M. leprae* and *M. lepromatosis* in wild armadillos from North Florida (NF) and Texas to assess transmission potential and public health risks. Tissue samples from NF and Texas armadillos and nasal and fecal swabs from NF animals were extracted and DNA analyzed using qPCR assays specific to *M. leprae* and *M. lepromatosis*. Bacterial loads were determined using standard curves. Samples underwent whole-genome sequencing for strain characterization. In addition, blood samples were tested for the presence of *M. leprae* specific PGL-I antibodies via ELISA. Preliminary results showed no detection of *M. leprae* or *M. lepromatosis* in 26/26 Texas armadillos, while 6/80 NF armadillos tested positive for *M. leprae*, with two samples having sufficient DNA for whole genome sequencing. Phylogenetic analysis is ongoing to identify circulating strains.

R70 Comparative Study of Electrolyte Composition in Tin Electrodepositions

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Tin is commonly used and deposited on various materials in fields like batteries, microelectronics, jewelry, and the automotive industry. A common deposition strategy is

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known as electrodeposition. Electrodeposition utilizes a liquid rich with ions (electrolyte) and an electrical current in order to bind ions onto a conductive surface. The purpose of this study is to understand the properties that can vary when the electrolyte solution is changed for the electrodeposition of tin. Both aqueous and non-aqueous electrolytes were examined under various electrochemical techniques. These were then characterized primarily by scanning electron microscopy and powder X-ray diffraction to determine features such as size, morphology, oxidation state, and molecular geometry. Preliminary results show that the choice of electrolyte drastically alters these features. These differences can primarily be seen in the preferred orientation of tin and the size distribution for the crystals that form. This work aims to contribute an objective evaluation for tin electrodeposition effects based on electrolyte composition.

R142 Impact of Amino Acid Difference at Residue 226 in Cervid Prion Protein on Disease Outcome

Elizabeth Host

Xutong Shi

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Research Poster

Chronic Wasting Disease (CWD) is a prion disease affecting cervid species in North America since 1967. Our previous studies showed that the primary structural differences at residue 226 of deer and elk prion protein (PrP) dictate selection of distinct CWD prion strains in gene-targeted mice expressing cervid PrP. Here, by using the same platform, we characterized the CWD strain properties of farmed red deer (*Cervus elaphus*) in Quebec, Canada. We assessed how genetic variation in Canadian red deer and the route of inoculation impacts CWD disease phenotype, infection kinetics and prion distribution in the brain. Our results suggest that transmission of Canadian red deer CWD prions into mice expressing homozygous glutamate (EE) at 226 residue of PrP is more efficient compared to mice expressing homozygous glutamine (QQ) at the same position, and the transmission efficiency into mice expressing heterozygous EQ at 226 residue of PrP depends on the amino acid expressed in the field isolate. Data also shows that the differences between the intracerebral and intraperitoneal inoculation routes impact prion strain biochemical and neuropathological properties. These findings suggest that both the amino acid variation at residue 226 of PrP and the different inoculation routes impact prion strain properties. Our results provide insight into the mechanisms governing prion strain selection and adaptation.

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R152 Wireless Electrochemical Immunosensing: Portable Quantitation Via NFC

Potentiostats

Wyatt Hummel

College of Natural Sciences

Research Poster

Infectious diseases such as COVID-19 continue to pose significant global health challenges, particularly in resource-limited settings where access to laboratory diagnostics is constrained. In addition to diagnostic testing, rapid and accurate quantification of immune system biomarkers is essential for monitoring disease progression, evaluating vaccine efficacy, and guiding public health interventions. To address this need, we present a novel magnetic bead-based electrochemical immunoassay compatible with a portable, near-field communication (NFC)-enabled potentiostat, enabling wireless detection of antibody neutralizing efficiency. Our platform translates biochemical recognition events into quantitative electrochemical signals using enzyme-mediated redox reactions, achieving high sensitivity and specificity comparable to standard ELISA techniques. The device demonstrates strong potential for decentralized, point-of-care testing by leveraging smartphone compatibility and low-cost assay design, this system offers a scalable solution for infectious disease monitoring.

R83 Dissecting DNA damage signaling pathways for BRCA1 and BARD1 recruitment

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Research Poster

Upon DNA double-stranded breaks (DSBs), cells initiate signaling cascades that recruit repair machinery, collectively known as the DNA damage response (DDR). Typically, these pathways are initiated by the ATM and ATR kinases, which recruit downstream DDR factors through phosphorylation of histone H2Ax and histone ubiquitin conjugation pathways. These factors include the Breast cancer type 1 susceptibility protein (BRCA1) and its binding partner, BRCA1-associated ring domain 1 (BARD1). Unexpectedly, we found that inhibiting ATM and ATR leads to BRCA1 and BARD1 relocalization in the nucleolus, specifically during the G2 phase of the cell cycle. Further inhibition of the E1 ubiquitin-activating enzyme prevents this nucleolar localization, suggesting a dependence on ubiquitin conjugation. These findings point to a non-ATM/ATR dependent mechanism for the recruitment of BRCA1 and BARD1 to the nucleolus, a

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site of ribosome biogenesis. This may reveal novel functions of BRCA1 and BARD1 beyond ATM/ATR-induced DDR pathways and provide new insights into breast cancer etiology.

R119 Influence of pre-fire beetle kill on post-fire Hairy Woodpecker (*Leuconotopicus villosus*) abundance in the Southern Rocky Mountains, Colorado

Lilly Jones

Leah McTigue

College of Natural Sciences

Research Poster

Post-fire landscapes provide critical foraging and nesting habitats for woodpeckers, especially in areas with pre-fire beetle infestations. Hairy Woodpeckers (*Leuconotopicus villosus*) are known to respond to natural disturbances like wildfires and beetle outbreaks, making them helpful indicators of forest recovery. There has been an increase in beetle-killed trees in Colorado due to bark beetle (*Dendroctonus* spp.) infestations, proposing the question of how these disturbances influence post-fire ecosystems. This study examined the relationship between Hairy Woodpecker relative abundance (RA) and the distance to beetle-killed trees in areas around the 2020 Cameron Peak Fire. We deployed acoustic monitoring units at points within the burn area during summer 2023 to record woodpecker abundance. Pre-fire beetle kill data was obtained from the U.S. Forest Service National public datasets that used aerial surveys. We used data from 2016-2019. We see a negative relationship between Hairy Woodpecker RA and distance to beetle-killed trees, with higher woodpecker abundance observed near areas pre-fire beetle mortality. This study provides useful insight into how pre-fire beetle outbreaks contribute to habitation conditions that influence woodpeckers distribution after fire, as woodpeckers are often drawn to beetle-infested trees due to their prey availability and foraging substrates. It is important to understand these interactions for informing post-fire management strategies and supporting biodiversity conservation in fire-affect landscapes.

R80 Mechanochemical Synthesis of Defect Tolerant Semiconductors

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Research Poster

Semiconductors are used in a variety of technologies, including solar panels. Currently, the

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semiconductors within solar panels utilize rare earth minerals and are defect intolerant. Rare earth minerals can be toxic to the environment and human welfare depending on mining conditions. A specific crystal structure called a perovskite with formula of ABX_3 has become relevant as a viable type of semiconductor, however they sometimes still utilize similar metals. As a result, there has been an investigation towards hybrid hollow organic-inorganic perovskite (HOIP) semiconductors, with a focus on methylammonium tin iodide ($MA\text{SnI}_3$) HOIPs doped with ethylene diammonium (en) at varying percent incorporations. This $MA\text{enSnI}_3$ has proved to be defect tolerant and viable as a semiconductor, however the solution based synthesis is time and energy intensive, with varying results. Therefore, we investigated an alternative mechanochemical method of production, using a high energy ball mill. We synthesized various percent incorporations of $MA\text{enSnI}_3$ and analyzed the product to check for purity and that we made what was intended. Our new mechanochemical synthesis method resulted in viable $MA\text{enSnI}_3$ that could be utilized as semiconductors in solar cells.

R130 Fueling acclimation to challenging environments in highland and lowland deer mice (*Peromyscus maniculatus*)

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Shady Kuster

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Research Poster

Deer mice (*P. maniculatus*) have the widest elevational range of any North American mammal. At high elevations, mice experience cold and low oxygen (hypoxic) environments. Small body mass and cooler environmental temperatures have been shown to contribute to a high metabolic rate in mammals. To sustain a higher metabolic rate, more food is consumed to meet that demand. However, hypoxic conditions downregulate metabolism in small mammals, resulting in hypometabolism. High altitude natives have evolved mechanisms to combat cold hypoxic conditions. Therefore, we aimed to investigate if acclimation to cold hypoxia results in hypometabolism in deer mice derived from highland (4,348m) or lowland (656m) populations. Deer mice were acclimated to either a cold hypoxic or cold normoxic environment for 6 weeks. Weight and food consumed were measured at the end of each week for each mouse. We then divided weekly food consumption by body mass, using this as a proxy for understanding changes in metabolic rate. We found that lowland deer mice appear to decrease food consumption from cold normoxia to cold hypoxia acclimation, while this pattern was not observed in the highlanders. This pattern may suggest that highlanders are attenuating hypometabolism. These findings support the idea that mice with high elevation ancestry have

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evolved a mechanism that maintains metabolism, ultimately reducing the negative impacts of challenging environments.

R125 Aldehyde Dehydrogenase 1 & 2 knockout protects against dieldrin-induced dopaminergic neurodegeneration.

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Ronald Tjalkens

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Research Poster

Parkinson's disease (PD) is the fastest growing and second most prevalent neurodegenerative disease in the world. Many factors result in an increased risk of developing PD, including exposure to environmental toxins. One such exposure associated with an increased risk of developing PD is the pesticide dieldrin. The mechanism by which dieldrin induces the loss of dopaminergic (DA) neurons is unknown. In-vitro studies in DA cultures treated with dieldrin results in an increase in DOPAL, a reactive DA metabolite. DOPAL is metabolized by aldehyde dehydrogenase (ALDH), leading us to hypothesize that the neurotoxicity of dieldrin is mediated by inhibition of ALDH. To examine this hypothesis, 8-week-old ALDH 1 & 2 (ALDH1/2) knockout (KO) and wild-type (WT) mice were dosed with dieldrin (0, 1, or 3 mg/kg) daily for six weeks via oral gavage. Stereological quantification of nigrostriatal neurons was performed on immunofluorescent- and H&E-stained sections using AI-based cell identification. Our results do not support our hypothesis; male WT mice show a greater loss of DA neurons compared to with KO mice. Moreover, western blotting of striatal tissue reveals an increase in pro-inflammatory markers in male WT mice. It may be that abolition of ALDH1/2 activity in male KO mice results in the induction of alternative DOPAL-clearing pathways unaffected by dieldrin. These findings add to our understanding of how pesticides contribute to PD and the role of DA metabolism in neurodegeneration.

R85 Evaluating LTR Promoter Strength in Diverse HIV-1 Strains Using an H2B-RFP Reporter

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Chaoping Chen

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Research Poster

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Human immunodeficiency virus (HIV) is a highly invasive pathogen primarily transmitted through reproductive routes via blood/blood-derived products. It preferentially infects CD4+ T-cells, integrating its genome into the chromosomes of these cells. Over time, HIV progressively weakens the immune system through CD4+ T-cell hindrance, ultimately leading to acquired immunodeficiency syndrome (AIDS). The long terminal repeat (LTR) of HIV has functions of RNA maturation, as well as the transcription promoter, playing a crucial role in the expression of viral genes. Notably, LTR sequences vary across viral strains, and these variations can influence transcriptional activity and viral proliferation in host cells. This project employs an H2B-RFP biomarker in a highly sensitive infectivity assay to investigate the functional properties of different LTR sequences. We examined the NL4-3 WT (subtype B), MJ4 (subtype C), and three clinically isolated strains (GLa, b, and c) using our newly established infectivity assay. Our results revealed that NL4-3 WT and MJ4 exhibited similar infectivity, while GLa, b, and c showed slightly reduced infectivity. To investigate whether and how infectivity correlates with H2B-mRFP signals, we analyzed H2B-mRFP signal intensity of individual infected cells due to their expression being LTR driven. Notably, the mean fluorescence intensity closely correlated with viral infectivity despite the wide variation in H2B-mRFP signal intensity among infected cells. This correlation appears to be influenced not only by the numbers of NF- κ B binding sites, but also other elements within the LTR region. Our assays provide new insights into the relationship between LTR promoter strength and viral infectivity.

R106 Intervening Proteins Control Archaeal DNA Replication

Emmanuelle Knecht

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College of Natural Sciences

Research Poster

DNA replication is fundamental for cellular division and genome integrity, where errors result in disease states, including cancer. Given the importance of DNA replication, a variety of proteins assemble in a necessary replication apparatus we call the replisome. The replisome orchestrates DNA replication efficiently and resolves associated errors. The replisome proteins are encoded in replication, repair, and recombination (RRR) genes. Many of these genes also encode special intervening proteins known as inteins, which function by removing themselves from their host protein, and likely originated from unknown external sources rather than the host genome. Our organism of study, *Thermococcus kodakarensis* (Tko), is an archaeon, in a different domain than eukarya and bacteria, and is adapted to extreme environments. In the genome of Tko, an abundance of inteins are encoded within RRR genes. The function of these inteins remains largely unknown. To better understand how Tko may use inteins, we are

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constructing genetically modified variants with individual intein deletions to see the effects on replication strategy and cellular fitness. We have already made progress on mapping the *Thermococcus kodakarensis* replisome, particularly in protein-protein interactions that form the DNA replication apparatus in the preferred replication method of Tko. We are now expanding on our work to elucidate the replisome, with the discovery that Tko can be induced into an alternative replication technique, closer to that of how humans replicate DNA. Our current endeavors in replisome mapping focus on examining protein-protein interactions in both replication behaviors to gain a comprehensive understanding of replisome dynamics.

R108 Investigation of synthetic prion strain evolution upon in vivo and in vitro passaging using gene-targeted mice models

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Glenn Telling

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Research Poster

Chronic wasting disease (CWD), which affects deer and other cervids, is part of a group of inevitably fatal neurodegenerative disorders known as prion diseases. In these diseases, the cellular prion protein (PrPC) misfolds into a pathogenic isoform termed prions. Prions can exist as strains that can differ in their biochemical and biological properties. CWD is endemic in North America; however, beginning 2016, CWD emerged in Nordic countries, prompting the need for new in vivo and in vitro models to study novel strains. Compared to traditional transgenic models, gene-targeted (Gt) cervidized-mice provide a more accurate model system to study natural CWD pathogenesis. Regarding the in vitro models, the de novo generation of synthetic prions from noninfectious sources offers an easily manipulatable system to study strain properties. To investigate the potential emergence and evolution of cervid prion strains, we characterized synthetic prions before and after in vivo and in vitro transmission into a Gt cervidized-mouse brain environment. In vivo characterization was performed by intracerebrally and intraperitoneally inoculating cervid synthetic prions in Gt cervid mice. The in vitro counterpart involved spiking cervid synthetic prions into uninfected brain homogenate and amplifying them through cycles of sonication and incubation. To compare the end products of these processes to the original inocula and CWD field isolates, we will analyze their biochemical properties on Western blot using specific antibodies, their conformational stability, and cellular tropism. In this study, we strive to provide a comprehensive methodology to characterize de novo prions, gaining insight into strain emergence and evolution.

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R66 Informing Tactical Periodization In Collegiate Football

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Aaron Nielsen

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Research Poster

In preparation for a competitive season, a team or individual may employ tactical periodization. This is the practice of manipulating training loads throughout a season, with the goal of being most prepared for games of most importance. While coaches often use athletes' physical conditions to inform training regimens, external factors remain less researched. In football, it may be common knowledge that traveling farther distances or facing a more talented team will reduce winning probability. In this study, a Game Difficulty Index (GDI) was created for use in College Football. Factors regarding travel distance, coaching experience, team talent, returning production, and past success were collected for the 2022 and 2023 seasons. Logistic regression was considered on the binary response of game outcome (Win/Loss). Four models were trained on the 2022 season and tested on the 2023 season. The final model selected achieved an accuracy of 72%, selected not only for its predictive performance but also use of interpretable factors. The factors of previous season success and team talent were determined to be the most influential. Additionally, odds ratios were analyzed throughout the course of the season to determine how each factor's influence changed over time. The final GDI model was subsequently retrained on all available data and implemented by the Nebraska Football team to inform tactical periodization strategy prior to the 2024 season.

R93 Testing MSH1 Repair Fidelity in *A. thaliana*

Jenna Marron

Daniel Sloan and Patricia Vail

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Research Poster

Mutations are the ultimate source of genetic diversity, but the rate at which they occur varies dramatically across the tree of life. In plant mitochondria and chloroplast genomes (organelles), mutation rates are orders of magnitude lower than in all other eukaryotes. Recently a nuclear encoded gene (MutS Homolog 1 [MSH1]) was shown to be essential in maintaining the fidelity of organelle DNA transmission. MSH1 has a unique structure that includes a mismatch recognition domain and endonuclease domain, which potentially allow it to both identify

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nucleotide mismatches and induce double stranded breaks for recombinational repair. In this experiment, we are using a CRISPR-based genome editing technique (prime editing) to increase the error rate of plant organelle polymerase Pol1B (Pol1Bexo-) to test the hypothesis that MSH1 recognizes and fixes mismatches from polymerase errors. We are generating populations of Pol1Bexo- plants in WT and *msh1* mutant backgrounds. Extracted DNA will be subjected to a Cleaved Amplified Polymorphic Sequence (CAPS) assay, plants that contain the Pol1Bexo- edits will generate a unique restriction site, allowing detection of successfully edited plants. Prime editing has extremely low efficiencies (<0.1%) and this study is among the first to utilize this revolutionary technology in *Arabidopsis thaliana*. We are developing an efficient pipeline by pooling DNA extractions and maximizing gel electrophoresis lane capacity. We predict that, if our prime editing strategy works, there will be extreme increases in mutations in the *msh1* mutant populations but no effect in WT populations, as the presence of MSH1 will repair polymerase mismatches.

R123 Overexpression of wildtype synaptotagmin improves motor behavior in a *Drosophila* model of congenital myasthenic syndrome

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Nathan Pettid and Noreen Reist

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Research Poster

Congenital myasthenic syndrome is a hereditary neuromuscular disorder characterized by muscle weakness and disability. One cause is mutations in synaptotagmin, a protein essential for neurotransmitter release at neuromuscular junctions. This study utilized a *Drosophila* model of two synaptotagmin mutations found in humans, *syt-D1E* and *syt-P-L*. Unpublished research from the Reist lab demonstrated that introducing an additional wildtype copy of synaptotagmin rescued neuromuscular function; electrophysiological measurements of neurotransmitter release in larvae expressing additional synaptotagmin were not significantly different from wildtype controls. Additionally, unpublished communications suggest that electrophysiology is a highly sensitive predictor of motor behavior. To investigate whether the electrophysiological rescue results in a behavioral rescue, we assessed locomotor activity in flies with or without the additional copy of wildtype synaptotagmin using a *Drosophila* Activity Monitor assay. For flies with additional wildtype synaptotagmin, results revealed significant improvement in motor activity in both males and females of both mutant lines. These results clearly show some promise of this technique as a potential treatment, although the effect sizes are relatively small. Future work will explore whether introducing two additional copies of wildtype synaptotagmin enhances behavioral rescue.

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R148 The PHQ-2 and the PHQ-8 as Screening Tools for Depression Severity in a Clinical Trial

Jayden Mather

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Research Poster

When recruiting subjects for clinical trials, using brief and effective screening tools is important in order to reduce both subject and study team burden. Clinical trials for Major Depressive Disorder (MDD) often use various forms of the Patient Health Questionnaire (PHQ) as a brief screening measure of depressive severity. In an ongoing clinical trial for depression at the Vail Health Behavioral Health Innovation Center, we conducted an exploratory analysis comparing the PHQ-2 and PHQ-8 as screening tools for MDD severity. Potential participants (n = 57) were prescreened with the PHQ-2 (n = 57) and PHQ-8 (n = 23) for depression symptoms. At screening, depressive severity was measured with the clinician-rated Montgomery–Åsberg Depression Rating Scale (MADRS), where a score of 28 or greater was used as a cutoff score. PHQ-2 sensitivity and specificity were 0.70(95% CI [0.53, 0.84]) and 0.55(95% CI [0.32, 0.77]), respectively. PHQ-2 scores had a medium positive correlation with MADRS scores ($r = .22$, $p = 0.12$, 95% CI [-.05, .45]). The PHQ-8 sensitivity and specificity were 0.77(95% CI [0.50, 0.93]) and 0.50(95% CI [0.12, 0.88]), respectively. PHQ-8 scores had a very small negative correlation with MADRS scores ($r = -.01$, $p = .97$, CI [-.42, .41]). The PHQ-8 had higher sensitivity for detecting the depressive severity, while the PHQ-2 had higher specificity for detecting depression severity.

R91 Barriers to Carrying Naloxone at Festivals

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Research Poster

Fentanyl-contaminated substances have introduced a serious problem to the festival scene, particularly in light of environmental factors like heat and overcrowding at events. Naloxone is a medication that reverses opioid overdoses; this offers festivalgoers a potential tool to prevent fatalities from accidental fentanyl exposure. A survey was conducted at a 4-day Colorado music festival (N=227), aiming to explore the extent to which festival attendees carry naloxone, document their previous experiences with naloxone, assess their confidence in responding to

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an overdose, and identify hurdles that prevent attendees from bringing naloxone to festivals. 29% of attendees reported carrying naloxone at least half of the time, while 44.9% specified they never carried naloxone before. Among participants surveyed, 8.4% have previous experience using naloxone to reverse an overdose, while 4.4% have received naloxone during an overdose. Additionally, 78.6% had never received formal naloxone training. Regarding confidence in naloxone administration, 50.2% described themselves as only somewhat or slightly confident. Barriers to carrying naloxone included festival rules, access, legal concerns, training and knowledge, convenience challenges, and the view that carrying naloxone is not their responsibility. Findings suggest the improvement of access to naloxone, training, and awareness at festivals.

O17 Psychedelic Symbiosis

Magnus Miller

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Oral Presentation

Naturally occurring psychedelics, which are classified in 3 subclasses of 5HT_{2a} agonists of non synthetic origin are produced within over a dozen genera and hundreds of species including *Homo sapiens*. Indigenous people including but not limited to those of the continents of Africa, America, and Europe have utilized these species for millennia in a pan global tradition of psychedelic influenced spirituality and medicine. These psychedelic producing species have a profound conscious altering effect that shapes our thinking, behavior and religious views. The species containing them are often found in association and close proximity to *Homo sapiens* and their activities in a mutualistic symbiotic relationship. In agriculture alone one can find many different species of psychedelic plants and fungi. This symbiosis is not only aiding the psychedelic species but also humans in a mutualism that transcends ecology as they are exalted in spiritual and medical practice.

R139 Tethering Ferredoxin 2 to Geranylgeranyl Reductase to Direct Electron Flux in *Thermococcus kodakarensis*

Savina Miller

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Research Poster

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Microbes living in extreme environments must develop specific metabolic pathways to survive. *Thermococcus kodakarensis*, a hyperthermophilic archaeon, utilizes metabolic pathways to synthesize unique molecules, such as isoprenoid lipids. Lipid maturation requires electrons to generate fully saturated isoprenoids. Geranylgeranyl reductase (GGR) is known to carry out lipid maturation, but it must receive electrons for the reduction reaction. *T. kodakarensis* utilizes proteinaceous electron carriers, such as the ferredoxins, and there are three ferredoxins encoded in the genome. Previous research supports that ferredoxin 2 (Fd-2) interacts to give the electrons to GGR for lipid maturation. Thus, effective production of matured isoprenoids is dependent on the effective flux of electrons from Fd-2 to GGR. To probe the specificities of proteinaceous electron transfer, we are designing and generating strains of *T. kodakarensis* that natively express Fd-2 tethered to GGR, such that these two proteins are linked within the cell at all times via various lengths of amino acid tether sequences ranging from 9-35 amino acids. Generation of strains will allow for various characteristics of proteinaceous electron transfer in vivo to be better understood.

O27 Antineoplastic Vanadium drug loaded solid lipid nanoparticles (SLNs)

Alex Nadelson

Abhinandan Banerjee

College of Natural Sciences

Oral Presentation

Certain types of aggressive cancers such as glioblastoma are incredibly difficult to treat, as they are quick to develop resistance to treatments and often involve invasive therapies like intracranial injections. To overcome current issues of therapeutic resistance, a new class of anticancer therapies have been developed that are vanadium based, which display strong selective cytotoxicity for cancer cells and short lifetimes. These therapies, while highly effective, have issues with plasma instability, lipophilicity and an inability to cross the blood brain barrier. It is therefore of high interest to develop new delivery systems for these treatments that are less invasive and more stable, while still allowing for effective cancer treatment. Lipidic nanocarriers have increasing uses in drug delivery systems, notably in vaccine formulations, as they are bio compatible, have precise targeting abilities and allow for highly controlled drug release. Using a new class of lipidic nanocarriers, solid lipid nanoparticles (SLNs), the vanadium based anticancer drugs are encapsulated within to allow for less invasive treatment, better stability and controlled drug release. To encapsulate the payloads in the SLNs, the probe ultrasonication method is used, in which the payload is dispersed into the melted lipid, then sonicated with a hot aqueous non-ionic surfactant solution, followed by sonication with a cold aqueous ionic surfactant solution to obtain the V-loaded SLNs. The SLNs are characterized using

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DLS, confocal scope, AAS and NMR. Drug loading parameters and stability tests will be carried out on them along with release and cytotoxicity evaluations to determine if this is a viable delivery protocol.

R68 How do plants maintain extremely low rates of mutation?

Juniper Newell

Amanda Broz

College of Natural Sciences

Research Poster

Compared to other eukaryotes, plant mitochondrial and chloroplast genomes display exceptionally low rates of mutation. A previous study identified MutS Homolog 1 (MSH1), a gene within the MutS mismatch repair family, to be critical to the prevention of organelle genomic sequence variants. However, the mechanism by which MSH1 maintains low rates of mutation, such as exactly what types of mutations it can recognize, or repair remains unknown. We hypothesize that MSH1 can recognize/repair damaged DNA bases in organelle genomes. To test this idea our lab is utilizing transgenic lines of the model plant *Arabidopsis thaliana*. These lines have been engineered to express a cytosine deaminase (Apobec3G) that damages organelle DNA and may or may not have a functional MSH1 gene. The first step in our experiment is to genotype plants for the presence/absence of MSH1 and the Apobec3G transgene. We will then confirm expression of the Apobec3G protein using immunoblotting. Finally, we will sequence organelle DNA from selected lines and assess mutation rates. If MSH1 is functional, we expect that it will repair most of the damage done by Apobec3G. However, if MSH1 is nonfunctional, we expect that the damage will go unrepaired leading to very high mutation rates in organelles. The results of our work would help inform how plants mechanistically maintain their extremely low mutation rates.

R146 Food insecurity and potential effects to academic success

Andrea Nichols and Heather Keevican

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Research Poster

Food insecurity significantly impacts the educational success of school-aged rural children in the United States, creating barriers to their academic achievement and overall well-being. This issue manifests in many ways, including a lack of access to nutrition, which directly influences

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cognitive development, concentration, and overall physical and mental health. Children from food-insecure households may come to school hungry, leading to decreased attention spans and engagement. Children facing food insecurity often experience increased absences due to health-related reasons or, depending on their age, may be working to supplement their families' income. This hinders their ability to keep up with schoolwork and participate fully in classroom activities. This review explores recent research on how food insecurity in rural areas affects the overall health and development of high school students. This paper reviews and analyzes existing research on food insecurity (FI), examining key studies that explore malnutrition, academic performance, physical and mental health. By synthesizing findings from multiple sources, this analysis highlights the impacts of food insecurity and discusses its implications amongst high schoolers in rural communities.

O12 From Yeast to Alzheimer's: Optimizing Human Pyrin-Only Protein 2 Production in *Saccharomyces cerevisiae*

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Oral Presentation

Alzheimer's is a prevalent neurodegenerative disease that causes cognitive decline, memory loss, and behavioral changes in individuals typically aged 65 or older. The Nod-Like Receptor Protein 3 (NLRP3) plays a vital role in Alzheimer's development by inducing an inflammatory response in the brain; human Pyrin-Only Protein 2 (POP2) inhibits the NLRP3 pathway, making it a potentially therapeutic protein. This study aims to assess the expression of human POP2 in model organisms *Escherichia coli* and *Saccharomyces cerevisiae* (Baker's yeast) to maximize protein yield. While *E. coli* is widely used for recombinant protein expression, eukaryotic *S. cerevisiae* offers beneficial post-translational modifications, potentially essential for protein folding; human POP2 expression has been successful in *E. coli*, but has yet to occur in *S. cerevisiae*. By optimizing expression conditions, this study aims to establish *S. cerevisiae* as a viable production system. A pre-ordered plasmid containing the human POP2 gene fragment will be used in *E. coli* expression. Using restriction enzyme digests, the codon-optimized human POP2 gene will be cut from the plasmid and cloned into a yeast expression vector for transformation into strain BY4741 of *S. cerevisiae*. Ideal growth conditions will be optimized via temperature, incubation time, and media composition. Western blot analysis using a x2 FLAG-tag will allow for protein expression level evaluation in both model organisms. This study lays the groundwork for future neurodegenerative disease research and potential applications in

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Alzheimer's treatment by demonstrating the feasibility of expressing human POP2 in *S. cerevisiae* and providing valuable insight into scalable protein expression strategies.

R99 Observing the Distribution of Plankton in Coral Reefs v. Sandy Habitats in Baja California Sur

Emilee Peterson & Emma Hathaway

Diane Wright

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Research Poster

This study investigates the differences in phytoplankton and zooplankton distribution in Baja California Sur, Mexico. The main focus was how plankton distribution varies between coral and sandy environments. Phytoplankton and zooplankton are prey items, key producers, and are vital components to ocean communities. Phytoplankton produce oxygen and add nutrients contributing to the microbial loop, while zooplankton aid in transferring those nutrients to higher trophic levels. Over a span of 2 days, samples were obtained by dragging a plankton net for 25 seconds over coral and sandy areas of the ocean at 2pm and again at 6pm. Results showed that phytoplankton and zooplankton are more abundant at night over the coral reef as opposed to nearby sandy areas. This suggests that plankton may be more active over coral reef habitats at night, compared to sandy environments during the day. The role phytoplankton and zooplankton have in marine environments is crucial to understanding how marine environments operate and function.

R110 Progress Towards Genetically Engineered Cell Cycle Arrest in Human Cells

Hannah Reitman, Alisa Shaw, and Colton Karns

Grant Schauer

College of Natural Sciences

Research Poster

The ability to temporarily induce replication stress within cells is valuable in the research of replication machinery and stress response pathways. To induce replication stress, researchers often target ribonucleotide reductase (RNR), an enzyme which is responsible for the conversion of ribonucleotides into deoxyribonucleotides, and which is essential to the progression of DNA replication. Currently, Hydroxyurea is widely used to inhibit RNR, but cells are burdened by oxidative stress caused by the drug, which causes not only specific inhibition of the replication

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machinery, but also nonspecific stress in cells that is difficult to reverse and which can be cytotoxic. This confounds our ongoing studies of the pathways responsible for replication stress tolerance. Our system being implemented utilizes auxin—a plant hormone which binds to and activates an E3 ubiquitin ligase which then targets the protein of interest for proteasomal degradation. This system allows conditional degradation of ribonucleotide reductase, ultimately preventing the cells from proceeding through DNA replication.

R121 Assessing the relationship between agricultural tasks and cardiovascular load among crop workers.

Jessica Reyes, Ann Hess, and Whitney Pennington

Morgan Valley

College of Natural Sciences

Research Poster

As a research assistant for the High Plains Intermountain Center for Agricultural Health and Safety (HICAHS), I gained hands-on experience working with large datasets. My primary focus was on organizing and analyzing data in R Studio to examine the relationship between agricultural tasks and cardiovascular load among crop workers. This work not only allowed me to refine my technical skills but also deepened my understanding of how data can be harnessed to address significant health and safety issues. Additionally, I plan to participate in the Celebration of Undergraduate Research and Creativity (CURC) to connect with fellow students, share my research findings, and gain valuable feedback from the academic community.

R133 Gender stereotypes of science do not predict the academia-career intentions of STEM graduate students: A search for explanations

Lily Roth, Alyssa Gibbons, and Christine Dunne

Silvia Canetto

College of Natural Sciences

Research Poster

Women are underrepresented at each higher level of STEM academia. Studies with STEM undergraduates suggest that endorsement of gender stereotypes of science (e.g., the stereotype that science is masculine or that men excel in science) may turn women away from STEM education and academia. No studies thus far have examined gender stereotypes of STEM among STEM graduate students. To address this gap, I examined among 125 female STEM

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graduate students whether beliefs that men excel in science, academia, and one's STEM field, and beliefs that STEM is masculine, areas are negatively associated with ranking academia in the top three career choices. Correlations and multiple regression analyses indicated no significant relationship between the predictors and outcomes. To understand the role of the measures in the results, I conducted further analyses on the measures used in this study. Inter-item correlations and factor analyses indicated that gender stereotypes questions about respondent's field had a different pattern from questions about general areas of academia or science. After testing these items as separate scales, however, the relationship between predictors and outcomes was still not significant. These results point to directions for future research. Research should examine gender stereotypes about specific STEM fields separately from gender stereotypes of science and academia in general. More research with STEM female graduate students is needed to understand the relationship between their gender stereotypes of STEM and their academic career intentions, and what may account for the differences between undergraduate and graduate students in gender stereotypes of STEM.

R88 Optimizing Biomolecular microcrystals for in vitro cell delivery

Ximena Sanchez Paredes and Caroline Slaughter

Christopher Snow

College of Natural Sciences

Research Poster

DNA and proteins play a fundamental role to all biological processes and their properties allow them to be used as molecular building blocks for innovative applications in biotechnology. One of these applications involves the formation of DNA-protein co-crystals, which can serve as porous organized molecular scaffolds. The co-crystals developed in the Snow lab feature chemically ligated DNA-DNA junctions using 1-ethyl-3-(dimethylaminopropyl) carbodiimide (EDC), enhancing their stability and creating a robust structure that is able to withstand a range of conditions such as blood serum, deionized water and stomach acid. This stability makes them ideal candidates for therapeutic delivery. Previous studies demonstrate the potential of pure protein or DNA-based crystals for intracellular delivery. We propose the use of these stable modular co-crystals as therapeutic delivery vehicles, targeting dendritic cells, which are key cells in the immune response. Prior studies in our lab have used co-crystals larger than 100 μm , but for in vitro cell delivery the co-crystals must be within the size range of 1-3 μm . To achieve this, our study focuses on developing a standardized batch microcrystallization protocol to grow crystals with the required size. Parameters such as precipitant to biomolecule ratio, DNA sequence and crystallization method through vapor diffusion or under oil will be optimized for this purpose. To verify crystal size and morphology of the produced microcrystals,

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characterization techniques will be performed using fluorescence microscopy, as each building block contains one fluorophore, and high resolution scanning electron microscopy. This project aims to optimize the production of biomolecular microcrystals for in vitro cell delivery and provide a potential novel approach to therapeutic material delivery via biological systems such as cell target therapies via dendritic cell uptake.

O13 Stamping Out Staph: Is it as Easy as a Spoonful of Sugar? Testing the Effectiveness of Homeopathic Remedies Against Pathogenic Biofilm Formation

Sorina Scohy

Jenniffer Riley

College of Natural Sciences

Oral Presentation

Various strains of Staphylococcus bacteria are among the most common pathogens on college campuses, which causes high amounts of antibiotics to be prescribed to and taken by students. However, the misuse of these medications by both students and medical professionals has contributed to rising global rates of antibiotic resistance, resulting in stronger, more deadly infections. This preliminary study aims to identify potential efficient and affordable methodologies for interrupting biofilm formation among these pathogenic bacteria, thereby combating mild infections without exacerbating the antibiotic crisis. In this study, Staphylococcus Cohnii was cultured in the presence of several common remedies with antibiotic properties to determine if they effectively reduced biofilm formation in each culture. A qualitative tube staining method was then used to visually assess whether or not each Staphylococcus sample developed biofilms. Previous studies have suggested that hand soap and ginger may be the most effective non-antibiotic methods due to their natural antibiotic properties. However, this study used five substances: water, soap, ginger, honey, and streptomycin.

R73 Synthesis and Spectroscopic Characterization of Antiproliferative Vanadium(V) Schiff Base Catecholate Complexes

Emma Scurek

Andrew Bates, Debbie Crans, and Skyler Markham

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Research Poster

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In recent years, vanadium(V) Schiff base complexes have been investigated as therapeutic agents for the treatment of cancer. This project describes the synthesis of a new class of compounds containing a novel SALIMP backbone functionalized with an ethoxy group (where SALIMP stands for N-(salicylideneamino)-2-(2-aminomethylpyridine)) as well as the characterization of the properties of these compound spectroscopic properties. Specifically, complexes with hydrophobic backbones and sterically hindered catecholate ligands have been found to have anti-cancer properties against human glioblastoma (T98G) cell lines. Within this family of compounds, those with the greatest activity contain a sterically hindered catecholate ligand, such as 3,5-di-tertbutylcatechol. This has been shown to increase hydrolytic stability and lead to better activity in cell culture conditions. It has also been recently demonstrated that a pyridine ring on the ternary Schiff base ligand increases compound stability, specifically when a 5-membered ring is formed with the vanadium center. Compounds containing the moiety described previously exhibit enhanced stability and increased activity in cell culture media. In this study, a series of new complexes were synthesized containing a novel SALIMP backbone functionalized with varying groups and the chemical and biological properties will be presented on this poster. The synthesis and spectroscopic properties of these complexes will be discussed. In addition, to presentation of this new class of compounds, their chemical and physical properties will be compared with a recently reported class of compounds and their antiproliferative effects on glioblastoma T98G cells.

R134 Investigation of PIE-1 Contribution to nos-2 mRNA Localization within P Granules Using RNAi

Kaelie Sellers

Steven Graham

College of Natural Sciences

Research Poster

Biomolecular condensates are subcellular structures that are widespread in various species, such as humans, mice, and bacteria. Various condensate types exist throughout biology, and form through phase separation of RNAs and RNA binding proteins. Many RNAs localize to condensates, and current research aims to reveal mechanisms of how specific RNA molecules achieve this localization. Understanding these pathways will improve our comprehension of biomolecular condensates and may provide insight to their alteration in cancer and neurodegenerative diseases. Here, we investigate a model mechanism of nos-2 mRNA recruitment to P granule condensates in *Caenorhabditis elegans*. PIE-1 protein has a role in localizing nos-2 mRNA to P granules in *C. elegans* PGCs. Whether PIE-1's contribution to nos-2 localization is attributed to its activity of transcriptional repression or its cytoplasmic RNA

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binding activity is unclear. We conducted RNA interference (RNAi) and Single-Molecule Fluorescence in Situ Hybridization (smFISH) to pinpoint the mechanism of PIE-1 mediated nos-2 mRNA localization during *C. elegans* embryogenesis. Under the PIE-1 depletion condition, nos-2 remains dispersed throughout the embryo and is seemingly degraded as embryogenesis progresses. Interestingly, RNA polymerase II depletion (via ama-1 RNAi) rescued nos-2 localization in a PIE-1 null mutant. This suggests that PIE-1's role in nos-2's localization to P granules is likely due to its activity as a transcriptional repressor, as PIE-1 protein is not physically required for nos-2 to localize to P granules. Our improved comprehension of the PIE-1/nos-2 mechanism in *C. elegans* germ line development may present a transferable model applicable to hundreds of P-granule localized mRNAs in *C. elegans* and other mRNA containing condensates in various biological systems.

C19 The Grey Area of Power: Navigating Systems for Real Change

Victoria Silva

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Research Poster

I love organizing, advocating, and pushing systems to their limits. People assume they have protections, until they realize enforcement is weak, and those in power count on exhaustion winning over persistence. They say, "They can't do that!" But actually, they can, and will. Not because it's right, but because the system thrives in the grey area between what should be and what is. In April 2022, I moved into a mobile home just as reports of elevated lead levels surfaced. I sought answers but found responsibility scattered, leaving residents to fend for themselves. Surveys revealed boil notice inconsistencies, sewage failures, and regulatory loopholes with no clear guidance. I asked questions, learned the system, and found cracks. I testified before the House and Senate for HB-1257, a bill to improve water testing and funding for mobile home parks. I worked with 9to5 Colorado, CDPHE, and CSU's Center for Environmental Justice to secure lead water filters from Brita for every home and helped launch the Water Ready Initiative. Advocacy isn't just about policy, protests, or calling senators, it's about understanding the system and making it work for you. One of the biggest mistake movements make? Burning out before they break through. Passion fizzles when it isn't used strategically. My work is about turning outrage into impact and teaching people to navigate the system before it swallows them. Because when you understand power, you stop asking for change, and you make it happen.

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R76 Optimization of a yeast-based biosensor for the quantification of human bitter taste and cannabinoid GPCR cell signaling

Victoria Silva

Arjun Khakhar, Lauren Farina, and Victoria Silva

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Research Poster

Human perception of bitterness and cannabinoids varies widely, yet quantifiable methods for studying these responses remain limited. Current approaches, such as mammalian cell-based biosensors and mass spectrometry, are costly and time-intensive. This study presents a scalable, cost-effective yeast-based biosensor expressing human G-protein-coupled receptors (GPCRs) to provide quantifiable receptor activation data for both bitter taste and cannabinoid signaling. Our system integrates yeast strains engineered to produce cholesterol in their membranes and rewires the endogenous yeast pheromone response pathway to function as a fluorescence-based reporting system for receptor activation. This model is applied to research two types of human GPCRs: We selected 25 synthetic biosensors modeled after human bitter taste receptors to measure receptor activation in response to bitterants. This allows for quantification of human response to bitterants, providing insight into genetic modifications that could reduce bitterness while maintaining nutritional density. Additionally, this system can help standardize sensory analysis, reducing reliance on subjective language in flavor profiling. The same biosensor expresses two human cannabinoid GPCRs quantification of cannabinoid-induced cell signaling. This research aims to inform clinical applications such as pain management, appetite regulation, and neurophysiological effects. Understanding receptor activation patterns can aid in optimizing cannabinoid-based therapies. Preliminary models demonstrated receptor activation, validating our system for further optimization. This biosensor offers a scalable, high-throughput platform for studying GPCR signaling, with applications in food science, therapeutics, and genetic engineering. Future work will focus on refining receptor expression levels, expanding biosensor capabilities, and improving assay sensitivity to enhance real-world applicability in food and pharmaceutical research.

R71 Plasticity and Relapse: Our labs Approach to Addiction Research

Samantha Skurnick and Samuel Hyken

Ana Clara Bobadilla

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Research Poster

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Substance use disorders (SUD) affect over 48.5 million Americans, costing the U.S. over \$740 billion annually. Relapse is the return to substance use after a period of abstinence. Relapse is common among individuals with SUD, with only 20-30% being able to maintain drug abstinence for one year. Given these high relapse rates, understanding the underlying causes of drug-seeking behavior is crucial. Using mice, we are able to observe this drug-seeking behavior post-abstinence, mimicking relapse behavior in humans. Our lab utilizes multiple preclinical behavior paradigms that model SUD and relapse in mice to answer two critical questions: what causes drug seeking, and how can we reduce it? We aim to understand how interconnected neuronal networks, or neural ensembles, encode and alter drug-seeking behavior via neuronal plasticity changes. We have shown that ensemble neurons increase in synaptic strength during drug-seeking. Synaptic strength is how effective two neurons are at passing a signal between each other, which is proportional to how well learned/reinforced a behavior is. Additionally, our lab has investigated potential therapeutics for reducing drug-seeking and has found that the psychedelic compound psilocin may reduce drug-seeking in female mice. These findings may culminate in the development of therapies targeting drug-seeking behavior at the neurobiological and pharmacological levels. Future directions include examining hormone-related differences to explain the reduced seeking in female mice and identifying gene targets for manipulation to curb drug-seeking. We believe this research is vital to treating addiction and understanding the neurobiological mechanisms that underlie relapse.

R79 An Attachment Perspective on Human-Equine Relationships: The Development of the Human-Equine Attachment Questionnaire.

Gabrielle Smith, Brittany Peters, Joshua Marsden, and Lorann Stallones

Ashleigh Zaker

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Research Poster

Not only is there a growing interest in the potential for human-horse interactions to be utilized in various therapeutic contexts, but there has been an increase in experimental intervention research regarding these techniques. However, theoretical frameworks to guide practice, as well as clarification about whether attachment bonds between humans and horses can form, remain unexplored. To address this gap, the current study aimed to develop a reliable and valid self-report scale to measure attachment between humans and horses. Hypotheses were based on a three-factor structure (secure, insecure-anxious, and insecure-avoidant) and the construct validity of the scale. An all-encompassing Human-Equine Attachment Questionnaire (HEAQ) was created and administered to 533 horse owners and lessees with diverse demographics.

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Results indicated the existence of a distinct bond between humans and horses, separate from attachments humans may form with other animals. These findings highlight the relevance of measuring and understanding the unique human-horse bond, and the HEAQ provides a novel tool that advances attachment research and informs outcomes for program development and application.

O18 Practical Applications of Psychedelic Assisted Psychotherapy for Transgender People

Matthew Stachniak

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Oral Presentation

This presentation aims to explore how psychedelic assisted psychotherapy (PAP) may be used to address the current mental health crisis that the transgender community is experiencing. Background on the current applications of psychedelic assisted psychotherapy and the state of mental health and mental healthcare access for the transgender community will be examined. This research will be synthesized to demonstrate potential practical applications of PAP for the transgender community. Suggestions for reducing access barriers and future implications for this research will also be explored.

R137 Establishing the Contributions of dUTPase in *Thermococcus kodakarensis*

Emily Staton

Thomas Santangelo

College of Natural Sciences

Research Poster

All life stores genetic information as DNA. DNA is highly susceptible to damage from endogenous and exogenous sources, which, if left unresolved, can contribute to genetic diseases or cell death. The maintenance of genome fidelity is thus vital for the survival of living organisms. One of the more common forms of DNA damage is the deamination of the canonical nucleotide base deoxycytidine (dC) to deoxyuridine (dU). Studying how cells handle environmental stress that promotes dU damage can be a promising avenue for disease research.

Extremophiles are a group of single-celled organisms that can thrive in extreme conditions and surprisingly maintain their genomes despite exacerbated deamination rates. One ideal candidate for further study is *Thermococcus kodakarensis* (Tko), a heat-loving ancient

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microorganism that thrives at 85°C (185°F). Previous studies with Tko characterized three DNA repair enzymes that resolve dU damage. Strains lacking multiple repair enzymes displayed significant growth defects. However, quantitative sequencing methods showed minimal dU damage in mutant strain genomes compared to the parental strain. An additional enzyme in Tko, dUTPase, has been identified to resolve dU in the nucleotide pool but has not yet been studied for its potential role in maintaining genome fidelity. To characterize dUTPase, we will use the same methods: growth curves and genome sequencing of strains lacking repair proteins and dUTPase. Our results will demonstrate potential differences in the abundance of dU damage for mutant strains compared to the parent strain and reveal the contributions of dUTPase in maintaining genome integrity.

R128 Comparison between normal and pathological neural activity in a mouse model of kainate-induced acute seizures

Samuel Stephenson

Seonil Kim

College of Natural Sciences

Research Poster

Epilepsy is a widespread brain disease impacting all age groups and affects nearly 50 million people according to the World Health Organization. Consequently, significant experimental and theoretical research attempts to find the mechanisms underlying the abnormal (and transient) brain electrical activity caused by epilepsy to facilitate the development of therapeutic solutions. With no appropriate treatments for seizures, understanding epileptogenesis is essential for therapeutic development. Seizure-genic circuits are located in the brain regions that support memory formation such as the hippocampus. In epilepsy, it is known that CA1 activities are abnormal, yet limited studies have compared CA1 dynamics between normal and pathological neural activity in the same animal. Here, we record brain electrical activity in a mouse model of kainate-induced acute seizures to analyze hippocampal oscillations before and after seizures in the same animal. We found that two sequential injections for 15 and 10 mg/kg kainate were sufficient to induce behavioral seizures in all animals. Importantly, we demonstrated that in kainate-injected mice, hippocampal oscillatory activity was significantly increased. Moreover, there were distinct patterns of hippocampal oscillatory activity in different stages of behavioral seizures. These findings suggests the importance of analyzing the appropriate network connectivity to investigate epileptiform activity, which further helps understanding epileptogenesis

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R72 Infrared Spectroscopic Investigation of Vanadium Catechol Complexes in the Solid State and Solution

Zachary Styrna

Andrew Bates and Debbie Crans

College of Natural Sciences

Research Poster

Vanadium-catechol coordination complexes have attracted significant interest due to their potential applications in catalysis, medicinal chemistry, and bioinorganic systems. In this study, we present the infrared absorption spectroscopic characterization of a series of vanadium catechol complexes, aiming to elucidate their coordination environment and bonding interactions. Fourier-transform infrared (FTIR) spectroscopy was used to investigate key vibrational modes of the complexes used to differentiate the structures, particularly the V=O stretching frequency. The changes in V=O stretching frequency of vanadium complexes bound to different catechol ligands will be discussed. The structures of vanadium complexes and comparisons of the solution and the solid-state structures will be presented. We will also determine if structural changes take place upon dissolution of the complexes in solution.

R144 Completing the Hypercube

Braeden Sweder

Ignacio Rojas Rojas

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Written Work

Completing the square is a commonly used geometric method for solving quadratic equations. A lesser known analogue of completing the square for cubic equations is known as completing the cube. While it originally only works on depressed cubic equations, (cubic equations without the quadratic term) every cubic can be reduced to solving a depressed cubic using a Tschirnhausen transformation. I have further extended completing the cube to be able to solve any cubic equation, even with a quadratic term (skipping the Tschirnhausen transformation). In spite of this, I have never seen an analogue of this for quartic equations, which I like to call "completing the hypercube". While difficult to visualize geometrically, it might be possible from an analytic perspective. Other methods exist for solving quartic equations, such as Ferrari or Descartes methods, however they use other techniques and are not a direct analogue of what completing the hypercube would look like. I will present all of my research on this

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problem, as well as background information for people unfamiliar with completing the cube. This is still a work in progress, and I am not sure if this problem is even solvable the way I am envisioning it.

R109 Investigating mixotrophy in an extremophile red algae

Atticus Swigris

Graham Peers

College of Natural Sciences

Research Poster

Understanding the growth properties of algae in various nutrient environments has been crucial for optimizing culture conditions in research and industrial applications. Additionally, establishing the ability to grow on light and reduced carbon compounds (mixotrophy) will facilitate our ability to investigate mutations in photosynthesis that would otherwise kill an obligate autotroph. This study investigates the trophic capabilities of the algal species *Galdieria partita*. The media used ranged from autotrophic conditions (CM++) to increasingly complex heterotrophic media with reduced carbon compounds - glucose, xylitol, LB broth, TryptonePlus, and yeast extract. Growth of cultures were monitored through optical density measurements. Initial results show that all media types support growth of the algae. This study provides insight into the metabolic flexibility of algae and will lead to the development of media to support the discovery of how algae can switch between carbon and energy sources.

R69 mRNA Localization of Nuclear Import Proteins Exhibit Variable Behavior Between *C. Elegans* and Human Cells

Nora Tayefeh

Ambika Basu, Erin Nishimura

College of Natural Sciences

Oral Presentation

Gene expression regulation controls the translation of genes into proteins both spatially and temporally. An important yet relatively understudied mechanism of gene expression control is subcellular mRNA localization, with major roles in developmental and cellular functions. Previous research from our lab has discovered that *imb-2* (Importin beta-2) mRNA concentrates around the nuclear periphery during *Caenorhabditis elegans* embryogenesis in a translation-dependent manner. To investigate if nuclear periphery mRNA localization is important in

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human biology, we investigated the localization of human homologs of imb-2. Two homologs of imb-2 exist in humans, tnp-1 and tnp-2 (transportin-1/2), whose proteins serve similar roles of importing cargo to the nucleus. Therefore, the mRNA would also be expected to localize to the nucleus like in *C. elegans*. To determine the location of these mRNAs, we used fluorescence microscopy on fixed human cells. Both tnp-1 and tnp-2 did not concentrate around nucleus therefore nuclear periphery localization is not a conserved phenomenon. This suggests that the imb-2 mRNA must have some associated signal that is driving its nuclear periphery localization in *C. elegans* embryo. We speculate this localization is either directly or indirectly linked to its encoded protein function. Our next step is to create transgenic human cells expressing imb-2 and observe if the mRNA has sufficient information to drive nuclear periphery localization itself.

O10 Direct Sampling of Confined Polygons in Linear Time

Kandin Theis and Clayton Shonkwiler

Clayton Shonkwiler

College of Natural Sciences

Oral Presentation

Science is often perceived as intimidating or inaccessible, creating barriers to engagement and learning. Our research group, Show Me Some Science, aims to shift this narrative by making science both entertaining and accessible to diverse audiences. By integrating interactive experiments and demonstrations into a large-scale showcase, we seek to demystify scientific concepts, combat stigma, and encourage curiosity-driven exploration. This initiative aligns with evidence from student-centered, active-learning approaches that show increased interest and retention when hands-on experiences are emphasized (Oliver-Hoyo & Allen, 2005). Similarly, hands-on, inquiry-based science programs have been found to enhance motivation, especially among underrepresented groups (Paris et al., 1998).

R95 Identifying intermediary forms of sterically hindered metabolizing vanadium anticancer complexes

Khanh Tran and Andrew Bates

Debbie Crans

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Oral Presentation

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Science is often perceived as intimidating or inaccessible, creating barriers to engagement and learning. Our research group, Show Me Some Science, aims to shift this narrative by making science both entertaining and accessible to diverse audiences. By integrating interactive experiments and demonstrations into a large-scale showcase, we seek to demystify scientific concepts, combat stigma, and encourage curiosity-driven exploration. This initiative aligns with evidence from student-centered, active-learning approaches that show increased interest and retention when hands-on experiences are emphasized (Oliver-Hoyo & Allen, 2005). Similarly, hands-on, inquiry-based science programs have been found to enhance motivation, especially among underrepresented groups (Paris et al., 1998).

O28 Making Science Fun and Accessible: A Hands-On Approach to Fostering Curiosity and Engagement

Roman Valdez, Nina Purves, Ayanna St. Hill, Lizzy Matias, Deepak Guduri, & Vacia Flowers
Adam Pearlstein, Heather Michalak, and Kellin Slate
College of Natural Sciences
Oral Presentation

Science is often perceived as intimidating or inaccessible, creating barriers to engagement and learning. Our research group, Show Me Some Science, aims to shift this narrative by making science both entertaining and accessible to diverse audiences. By integrating interactive experiments and demonstrations into a large-scale showcase, we seek to demystify scientific concepts, combat stigma, and encourage curiosity-driven exploration. This initiative aligns with evidence from student-centered, active-learning approaches that show increased interest and retention when hands-on experiences are emphasized (Oliver-Hoyo & Allen, 2005). Similarly, hands-on, inquiry-based science programs have been found to enhance motivation, especially among underrepresented groups (Paris et al., 1998).

R94 Synthesis and characterization of novel copper Schiff-base catecholate complexes for treatment of glioblastoma, a brain cancer

Dylan Vasquez, Andrew Bates, & Skyler Markham
Debbie Crans
College of Natural Sciences
Research Poster

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Development of therapeutics for difficult to treat or aggressive cancers, such as Glioblastoma brain cancer, is in high demand due to their inability to properly treat the cancer due to a lack of treatment methods. The use of highly cytotoxic, short-lived vanadium Schiff base catecholate complexes are advantageous to use for intratumoral injections to kill the cells and then rapidly decompose into less toxic components. In this project, we designed, synthesized and characterized novel Copper Schiff-base catecholates for potential use as anticancer agents. Recent publications from the Crans group have shown the development of several hydrophobic vanadium Schiff-base catecholate complexes, which are found to have prominent anticancer activity. These complexes have been shown to be highly active, with the lead compound notably being twelve times more active than cis-platin, a commonly used anticancer therapeutic. Current design modifications have led to the use of pyridines as part of the Schiff-base scaffold, and analysis of some vanadium Schiff base catecholate complexes has shown this modification has higher stability and biological activity of vanadium complexes. To better understand the impact of the metal with the non-innocent ligand system, our group is interested in investigating other commonly used metal centers in medicine. The potential of copper complexes are investigated and the synthesis of copper-Schiff based analogues of the vanadium complexes and their biological activities are investigated. In this poster, we specifically test our hypothesis that Copper Schiff-base catecholate derivatives have biological activity in T98G Glioblastoma cells and describe these novel complexes and their chemistry.

R136 Investigating DNA Repair in Extremophiles

Charlotte Wagner

Thomas Santangelo

College of Natural Sciences

Research Poster

Archaea are single celled prokaryotic organisms characterized by complex cellular pathways that allow them to live and thrive in extreme environments. These extreme environments are likely to cause excess DNA damage, yet it seems that Archaea have evolved necessary and likely very efficient pathways to repair damage. One possible repair pathway is Nucleotide Excision Repair (NER) which is found across the Eukarya and Bacteria domains but has not been proven to be conserved across the archaeal domain. We hypothesize there is a NER like repair pathway consisting of seven proteins implicated in repairing bulky DNA damage present in *Thermococcus kodakarensis* (Tko), a hyper thermophilic marine archaeon. To investigate the contribution of these proteins in maintaining genomic integrity we are assessing the retention of bulky DNA damage as a function of mutation frequency in the putative NER deletion strains

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through phenotypic and genetic screens. If these putative NER proteins are important in the repair of bulky DNA damage, then their absence should result in increased mutation frequency.

F1 OURA Experience

Mason Walker

College of Natural Sciences

Film

Documentary focusing on the OURA Lab experience.

R113 Mice Following Exposure to Agricultural Dust

Jade White, Alissa Threatt, Nathan Klepper, & Tara Gries

Julie Moreno

College of Natural Sciences

Research Poster

Routine exposure to organic agricultural dust (OD) has led to a higher chance in developing chronic lung inflammatory diseases. Previous research has confirmed that the same agricultural dust exposure that causes inflammation in the lungs is linked to an increased risk of developing dementia. In our previous study we found a rise in microglial inflammation. It is well known that gliosis can occur in parallel with a change in cognitive ability. Therefore, we hypothesized that mice exposed to OD would have a loss in cognition compared to the mice saline exposed mice. Here we investigated the cognitive modulation of mice after OD or saline exposure. Mice who have been exposed to the OD were exposed nasally and oropharyngeal, then monitored over the course of eight weeks. Using novel object recognition. A finding that our current preliminary data may support that there is not a notable difference from our baseline to the week 8 of our experiment comparing the OD exposed mice and the mice who were not exposed. We will also take the study further by examining the brains and lungs from these mice to determine the OD impact on the lung brain axis and the inflammation ensued. This study will allow for a deeper understanding of cognitive loss following OD exposure and correlate this to the systemic inflammation from damaging the lungs.

R115 Evaluating the Bidirectional Relationship between Performance and Burnout at Work: An Extension of the Job Demands-Resources Model

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Lander Wilkinson, Katelynn Burgess, & Kesea Nutter

Joshua Prasad

College of Natural Sciences

Research Poster

Burnout is a growing concern in the workplace, often attributed to excessive job demands and inadequate resources. The Job Demands-Resources model (JDR) suggests that burnout leads to diminished job performance, yet the potential for performance to drive burnout has received less attention. Using archival data from the Work, Family, and Health Study (N = 1,040), we examined whether fluctuations in individual job performance predict subsequent burnout at the within-person level. We used multilevel modeling analyses with a lagged-performance predictor to assess whether deviations from an individual's average performance impact later experiences of burnout. This revealed that increases in job performance relative to an individual's average predicted higher future burnout ($b = .004$, $se = .002$, $t = 2.03$, $p = .042$). This suggests a performance over-exertion effect—sustaining effort beyond one's baseline. While prior research supports the idea that burnout leads to diminished performance, our findings indicate that pushing oneself beyond typical performance levels may also deplete resources and contribute to later burnout. These results challenge the JDR model's assumption of a unidirectional relationship between burnout and performance, highlighting the need to consider performance-driven burnout as a potential mechanism. Implications of these findings include the importance of sustainable work practices and resource allocation to prevent overexertion and long-term exhaustion. Future research should validate these findings using additional datasets and explore potential moderating factors, such as job autonomy and support systems.

R131 Zephyr: Tracking the air you breathe

Brenna Wolf

Shrideep Pallickara

College of Natural Sciences

Research Poster

Air quality presents one of the biggest environmental risks to human health, having the potential to impact every organ and ranking second only to communicable diseases in public health risk. Air pollution contributes to reduced lung function, oxidative stress, and immunosuppression among other adverse health risks. Poor air quality contributes to more than 100,000 premature deaths in the United States each year, and 8.34 million excess deaths

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internationally each year. Continuous access to air quality data is key to educating citizens and driving legislative changes. The EPA has a large number of outdoor air quality monitoring sensors that harvest data regarding various airborne pollutants including particulate matter, ozone, carbon monoxide, nitrogen dioxide, and sulfur dioxide. We have designed a browser-based tool, Zephyr, that allows users to interactively analyze longitudinal (starting in 1980) air quality data tracking over 1400 different pollutants. An added feature of Zephyr is integration with the 2020 US census data to explore how socioeconomic factors correlate with exposure to poor air quality. Zephyr also overlays infrastructure data relating to coal and gas fueled power plants allowing users to assess how proximity to such power plants impacts air quality. We have also incorporated support for animating pollutant-specific variations so that users may assess air quality changes over time during transient, but often prolonged, events such as wildfires. Finally, the tool provides 7-day air quality forecasts using SARIMA models that provide insights into time-series trends. These models are fine-tuned for each metropolitan region to boost accuracy.

R92 Exploring Effects of the Natural Medicine Health Act in Colorado

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Cianna Piercey & Hollis Karoly

College of Natural Sciences

Research Poster

In 2022, Colorado voters passed the Natural Medicine Health Act, decriminalizing the personal use of several psychedelic substances, including psilocybin, DMT, and mescaline. However, research on how this policy shift has influenced individual and community behaviors, attitudes, and perceptions remains limited. This study used a survey to examine these impacts from 183 participants (mean age=29.73, AFAB=41.5%). Data was collected online and at Red Rocks Amphitheater. Most participants lived in Colorado for at least five years (65.7%) and were residents at the time of decriminalization (74.6%). Participants shared qualitative insights from open-ended questions into how decriminalization affected psychedelic use, risk perception, and substance availability. Among people who reported changes in personal use, some noted an increase in consumption, particularly microdosing psilocybin, as well as home cultivation of psilocybin and a greater perceived availability of psychedelics. Participants also observed a rise in psychedelic use within their social circles, reduced concerns about legal consequences, and increased awareness of the effects of psychedelics. However, some voiced concerns about

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inexperienced consumers lacking proper knowledge on how to consume psychedelics and potential harms associated with frequent use. These qualitative findings offer insights into the effects of psychedelic decriminalization in Colorado, informing policy and practice.

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R209 Creating a Theoretical Holistic, Natural Treatment for Post Traumatic Stress Disorder: A Literature Review

Erika Avila

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Research Poster

Post traumatic stress disorder (PTSD) is a psychological impairment which displays an increased fear response after a person experiences a traumatic event. PTSD manifests at different intensity levels and has various symptoms. Symptoms could include reoccurring thoughts or dreams about the traumatic event, hypervigilance, extreme emotion, environmental triggers, or high blood pressure. Abnormal activity in different brain areas is associated with PTSD. This includes hyperactivity of the amygdala, the hypothalamic pituitary adrenal axis and the anterior cingulate cortex. Contrary, hypoactivity is seen in the prefrontal cortex. These areas are implicated in mediating stress response, emotional regulation, and the flight or fight autonomic response. The prefrontal cortex is important in inhibition and regulation of these responses. Cognitive processing therapy is a primary and impactful treatment for PTSD. Cognitive processing therapy is often paired with medication, often used are pharmaceuticals utilized in depression or anxiety. Many patients do not respond well to pharmaceuticals which can also have many negative side effects. Pioneering research in the fields of psilocybin, music therapy, nutritional influence on PTSD, and bibliotherapy show promising results. These treatments offer alternative and holistic therapeutics. My research has compounded literature displaying effective natural treatments to formulate a theoretical treatment plan for PTSD with the goal of treating patients holistically to help the body and mind heal to support neurological recircuiting of the brain.

R161 Longitudinal Analysis of Chronic Wasting Disease of free-range deer populations in Arkansas

Lauren Bennett

Candace Mathiason and Nathaniel Denkers

College of Veterinary Medicine and Biomedical Sciences

Research Poster

Chronic wasting disease (CWD) is a fatal neurodegenerative prion disease affecting free-range and captive cervid populations in North America, Europe, and Asia. To better understand the pathogenesis of CWD in wild populations, 249 free-range white-tailed deer in Arkansas

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underwent serial capture between 2022-2025, had RAMALT biopsies performed, and eventually terminal samples collected. Immunohistochemistry (IHC) is the leading detection method of PrPCWD in tissues, yet real-time quaking-induced conversion (RT-QuIC) offers greater sensitivity for earlier detection in test samples. Here we investigated antemortem and post-mortem samples utilizing IHC and RT-QuIC to determine CWD progression. From antemortem RAMALT biopsies, RT-QuIC detected positive seeding activity in 60 of 271 samples (22.1%). IHC detected prion deposition in 39 of 251 samples (15.5 %), which were all corroborated by RT-QuIC positive results. Terminal samples were available from 74 of 249 deer, all having one or more antemortem biopsy samples. As a correlative value, antemortem testing identified 37 of 74 (50%) positive biopsies which were confirmed by positive terminal results. 16 of 74 (21.6%) deer were determined to be negative in antemortem samples but progressed to a positive status in post-mortem samples. 21 of 74 (28.3%) deer were negative in both antemortem and post-mortem samples. This data demonstrates that longitudinal and terminal sample analysis provides a more complete timeline and a greater understanding of CWD progression in free-ranging white-tailed deer. Ongoing completion of additional samples will continue to build upon our knowledge of CWD pathogenesis that may provide useful resources to management agencies.

R154 Global STING knockout differentially alters behavioral and nigrostriatal phenotypes of mice subjected to the rotenone model of Parkinson's disease in a sex-dependent manner

Abby Bibb

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College of Veterinary Medicine and Biomedical Sciences

Research Poster

Parkinson's disease (PD) is the fastest growing neurodegenerative disorder world-wide, with no known cause or cure. Rotenone, a mitochondrial complex I inhibitor and pesticide, has been harnessed in laboratory rodents to recapitulate the selective loss of nigrostriatal dopaminergic neurons characteristic of human PD, which is associated with mitochondrial dysfunction, including mtDNA damage and release. This motivates the interrogation of cytosolic nucleic acid sensing pathways, like the cGAS-STING signaling cascade, in this context. To this end, we sought to explore the effects of genetic STING ablation on behavior and nigrostriatal pathology in the murine rotenone model of PD. Male and female WT or STING KO mice were I.P. injected with 2.5 mg/kg/day rotenone or vehicle for 14 days followed by a 14 day post-lesioning period. Baseline behavioral data was collected prior to initial rotenone insult and subsequently compared against weekly timepoint data via open field and NoldusXT Catwalk gait analysis. This revealed significant treatment-dependent changes in male WT animals indicative of motor

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dysfunction which were not present in KO or female animals. These findings suggest a role of cGAS-STING signaling in PD pathogenesis in the murine rotenone model. The male-specific effects observed here reflect marked sex differences in the clinical presentation of PD. Future work will aim to parse out cell-type specificity of STING signaling relevant to these neurodegenerative sequelae.

R202 Selective cholinergic activation prevents hippocampal hyperexcitability, memory loss, and the in vivo growth of amyloid plaques in Alzheimer's disease

Ellison Black and Rahmi Lee

Seonil Kim

College of Veterinary Medicine and Biomedical Sciences

Research Poster

Alzheimer's disease (AD) is the most common form of dementia with no known cause and cure. Studies suggest that one of the main causes of AD is disruptions in synaptic activity of GABAergic inhibitory interneurons by beta-amyloid peptide ($A\beta$). This in turn decreases inhibitory activity to increase excitation in pyramidal excitatory neurons in the hippocampus, resulting in network hyperexcitability. Hyperexcitability in the hippocampal network also promotes $A\beta$ secretion and accumulation, leading to the formation of amyloid plaques, a central pathology of AD. This suggests that the $A\beta$ -induced reduction of hippocampal inhibition is a crucial trigger for the development of AD. Therefore, enhancing hippocampal interneuron activity is thought to be neuroprotective against AD. We thus hypothesize that $A\beta$ -induced hippocampal hyperexcitation promotes the in vivo rapid growth of amyloid plaques, which can be reversed by increasing hippocampal inhibition. Importantly, we discover that $\alpha 7$ - and $\alpha 4\beta 2$ -nicotinic acetylcholine receptors (nAChRs) predominantly control the nicotinic cholinergic signaling and neuronal activity in hippocampal parvalbumin-positive (PV+) and somatostatin-positive (SST+) inhibitory interneurons, respectively. To activate hippocampal inhibition, we injected drugs to stimulate $\alpha 7$ - and $\alpha 4\beta 2$ - nAChRs into 5-month-old amyloid pathology model (5XFAD) mice. Hippocampal sections from these mice were stained with Thioflavin S to visualize amyloid plaques. We found that in vivo co-stimulation of $\alpha 7$ - and $\alpha 4\beta 2$ - nAChRs significantly reduced the amyloid pathology in the 5XFAD hippocampus when compared to the control hippocampus. This suggests that co-activation of these two receptors significantly reduces the growth of amyloid plaques in 5XFAD mice by preventing hyperexcitation in hippocampal pyramidal cells.

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R156 SARS-CoV-2 ORF8 Protein: Illuminating COVID-19 Origin and Effects on MHC Class I and Interferon Signaling

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Alan Schenkel

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Research Poster

Severe acute respiratory syndrome Coronavirus-2 (SARS-CoV-2) caused a global pandemic in 2020. The genome of coronaviruses shows that the split between the bat and human strains was recent. One highly conserved gene between the bat and human strains is the Open Reading Frame 8 (ORF8). ORF8 blocks interferon signaling (via IRF3) and MHC Class I expression by trapping IRF3 and MHC Class I in the endoplasmic reticulum. Our hypothesis is that the few differences between bat and human variants may alter this ability. We made human epithelial cells expressing ORF8 and/or a green fluorescent protein (GFP) when interferon signaling is activated by viruses. We found that interferon alpha and beta did not turn on the GFP reporter. The virus genome mimic polymeric Inositol-Cytosine (Poly IC) did turn on the GFP reporter but was toxic to the cells. Our preliminary data showed less death in the cells that express ORF8 when treated with Poly-IC. We will next see if ORF8 expressing cells can be infected with SARS-CoV-2, see if the virus could turn on the GFP reporter, and if ORF8 increases or decreases viral replication. Currently we are validating that our antibody for ORF8 works and that our cells are expressing the ORF8 protein, but we have not been able to detect it. We are trying a new monoclonal antibody against ORF8, along with using control cells infected with SARS-CoV-2, and may try a different cell line moving forward. We are also staining for MHC Class I and IRF3.

R176 Signs of Accelerated Brain Aging in Young Adults with Mild Traumatic Brain Injuries

Riley Budzien

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Research Poster

Background: Young adults with mild traumatic brain injury (mTBI) have an increased risk of developing neurodegenerative diseases (e.g., dementia) and may experience accelerated brain aging. Our lab has found evidence of accelerated brain aging in young adults with mTBI; specifically, we observed compensatory neural recruitment in right prefrontal cortex (PFC)

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which resembles recruitment patterns of older adults. Methods: To test for additional signs of accelerated brain aging, we tested 15 young adults, 9 with mTBI (3 males, mean age=20.75) and 6 controls (2 males, mean age=20.71). We hypothesized that young adults with mTBI would show greater bilateral PFC recruitment compared to controls during a walking task. We used the functional near-infrared spectroscopy to measure neural recruitment (using a proxy measure of oxygenated hemoglobin, HbO) during walking. We used within subject t-tests to quantify neural recruitment (i.e., HbO) in right and left PFC during walking compared to neural recruitment during rest. Results: In the control group, within-subject t-tests revealed that during the single motor condition, there was significant neural recruitment in right PFC, $p < .001$ but not in left PFC, $p = .72$. However, in mTBI, within-subject t-tests revealed that during the single motor condition, there was significant neural recruitment in both right PFC, $p < .001$ and left PFC, $p < .001$. Conclusions: Our hypotheses were supported, as we saw that young adults with mTBI had bilateral PFC recruitment while controls had unilateral recruitment. These findings may suggest that young adults with mTBI experience accelerated brain aging which could have implications for their long-term health.

O21 Underlying Precocious Puberty Factors: Nature and Nurture

Wendy Camacho

Richard McCosh

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Oral Presentation

Puberty typically begins between 8 and 13 years of age, but Precocious Puberty (PP) occurs when this process starts prematurely, leading to physical and hormonal development. Central Precocious Puberty (CPP), results from the early increased stimulation in the hypothalamus of gonadotropin-releasing hormone (GnRH), increasing secretion of sex hormones. CPP is more prevalent in females than males, with a 1:4 ratio. The rising global incidence of CPP has driven research into its underlying causes. Key contributors include genetic predisposition, sedentary behavior, gestational weight gain, dietary nutrition, environmental exposures, ethnicity, and socioeconomic status. Exposure to endocrine-disrupting chemicals (EDCs), such as bisphenols, phthalates, and pesticides, has also been linked to earlier pubertal onset. Additionally, ethnic and socioeconomic disparities suggest complex interactions between biological, environmental, and behavioral factors. Long-term consequences of CPP extend into adulthood, impacting breast and ovarian cancer risks, bone health, fertility, and psychological well-being. Despite growing evidence, debates persist regarding the relative influence of each factor and their interactions. This review synthesizes current global research on CPP, highlighting established and emerging risk factors and identifying key gaps for future study in public health, pediatrics,

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and endocrinology. To complete this review, precocious puberty and CPP were used as key words for source identification. Additionally, a minimum of 12 sources were gathered each source aligned with the above-mentioned underlying factors. Proposed solutions vary due to the varying causes. Collectively more research into early identification and proper resource disbursement to underserved communities will help decrease population prevalence of CPP and respective long-term consequences.

R196 Combined Effects of Cannabis and Alcohol on Error Recognition

Cole Campbell

Patricia Davies & William Gavin

College of Veterinary Medicine and Biomedical Sciences

Research Poster

Cannabis is rapidly becoming one of the most widely used and available drugs across the U.S. second only to alcohol. But conversely to alcohol, very little is understood about the cognitive impacts of cannabis and its active component THC. Using electroencephalography (EEG) we can observe differences in brain activity related to the impact of intoxication on cognitive processing over time. This study examined the acute effects of cannabis and alcohol intoxication on inhibition during an attention demanding task across four time points. Both performance and brain activity measures were obtained during a speeded flanker task for alcohol only, cannabis only and co-use groups. We focused on brain activity associated with performance monitoring, error detection (error related negativity, ERN) and adaptation (error positivity, PE). These components of the event related potential (ERP) are elicited when a mistake is made and are seen as the brain's response to a mismatch between an intended action and an executed action. While all groups showed suppressed brain activity for ERN and PE at peak intoxication, the co-use group was significantly greater. The PE showed a significant cubic trend ($p = 0.032$) reflecting the suppression of the PE following intoxication, then a recovery of the PE in later time points. The reduced amplitudes of ERN and PE across intoxication conditions highlights deficits caused by alcohol and cannabis on inhibitory control. These effects were significantly greater in the combined intoxication group providing evidence of a strong additive effect.

R201 Caminos to Veterinary Medicine': A Summer Initiative Program for Underrepresented Students

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Research Poster

Many students face struggles in post-secondary education, such as finding the right field of study, support, or a sense of belonging, especially at White Prominent Institutions (WPI). As an underrepresented student, I struggled to find my place at CSU while pursuing and interest in Veterinary Medicine and I don't want others to face the same challenges. The "Caminos' to Veterinary Medicine" project targets to support underrepresented, first-generation students interested in Veterinary Medicine by providing hands-on experience and a sense of community. Whether it's through workshops or exposure to veterinary professionals, this program fosters leadership, encourages a long-term interest in the field, and helps students navigate the challenges of entering a veterinary career in the future as an underrepresented Student. My goal is to create a summer program with mentorship opportunities to boost students' confidence and knowledge, guiding them toward achieving their DVM in the future. Collaborating with veterinary alumni and professionals, we can provide essential support and eliminate barriers underrepresented students face in pursuing this career, whether it is the knowledge behind it or the language barriers that come within this career. Statistics show a lack of minority representation in the veterinary profession with only 7% being Latinx students (according to AVMA), which is preventing students from fully committing due to such a low percentage. This project aims to change that by increasing interest and participation in Veterinary Medicine within underrepresented communities (specifically Latinx students), ultimately enhancing diversity in the field.

R211 Beyond the Roots: Hairstyles and their Influence on the Societal Perceptions of Black Women

Nyawarga Chak

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Research Poster

Black women's hair has long been a site of cultural identity, self-expression, and, unfortunately, bias—particularly in professional settings. This study examines how Black women's hairstyles influence their societal perceptions, contributing to discrimination, stereotyping, and professional barriers. This study will collect personal narratives through surveys distributed to Black women in various majors, focusing on their experiences with classroom bias related to their hairstyles. The data will be analyzed using surveys to identify recurring themes and statistical analysis to examine discrimination patterns across different hairstyles and hair types.

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Through personal narratives gathered via surveys, this research highlights the lived experiences of Black women who navigate classroom and workplace biases based on their hair choices, from natural styles like afros and locs to protective styles such as braids and wigs. The project also aligns with ongoing legislative efforts, such as the CROWN Act, which seeks to end race-based hair discrimination. Ultimately, this study calls for a redefinition of professionalism that embraces diversity rather than penalizes it.

V7/W6 Roots & Elements

Nyawarga Chak

College of Veterinary Medicine and Biomedical Sciences

Visual Art

Over four months, Roots and Elements emerged as a visual exploration of transformation, nature, and connection. What began as simple, uninspired sketches evolved into vibrant, expressive artworks reflecting my deep appreciation for the earth and its elements. This collection captures the raw beauty of nature—wind, water, fire, and earth—interwoven with the shared roots that connect all living beings. Each piece symbolizes growth, change, and the ever-present link between humanity and the natural world. Through color, texture, and movement, Roots and Elements invites viewers to reflect on their own connection to the earth and the forces that shape us and bring humankind together.

R185 Diet and Gut Microbiome of Ugandan Insectivorous Bats Carrying Coronaviruses

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Kalani Williams and Rebekah Kading

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Research Poster

Many species of insectivorous bats are known to carry viruses, such as coronaviruses. A link has been suggested between gut health and immune response regulation in both bats and humans, but specific mechanisms have not yet been elucidated. Thus, understanding the relationship between gut microbiome composition and viral infection status is critical. This study aims to determine the major drivers of gut microbiome composition and diversity of insectivorous bats. Specifically, we focus on insectivorous bat species from the Mount Elgon Region of Eastern Uganda, taken from six different cave systems across the dry and wet seasons from 2022 to 2023. Sample processing for gut microbiome metagenomics was conducted using 178 fecal

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samples. DNA extractions were performed using the QIAmp PowerFecal Pro DNA Kit, and the concentrations were measured using Qubit fluorometry. The V4 region of 16S rRNA was PCR amplified in triplicate from the DNA. These triplicates were pooled for gel electrophoresis and next-generation sequencing preparation. Gel electrophoresis confirmed successful amplification of the 16s rRNA target gene. Samples were then purified using Agencourt Ampure XP magnetic beads. Purified PCR samples were sent to Azenta for Illumina amplicon sequencing. All samples will be analyzed using Qiime2. In addition to understanding how the gut microbiome is formed, our results may provide insights into how the gut microbiome impacts the immune system. Learning more about the relationship between diet and viral infection in bats may give us deeper insights about spillover and lead to further research of the bat immune response.

R214 Rapid Inactivation of Pathogens On Microscope Slides: A Platform for Improving Mass Spectrometry for Imaging of Samples from Infected Tissue

Yvette Cruz

College of Veterinary Medicine and Biomedical Sciences
Research Poster

Molecular imaging using mass spectrometry (MSI) enables identification of the changes in diseased versus neighboring cells within a tissue sample, including demonstrating delays in drug delivery to sites of need for effective treatment. Despite this, MSI for infectious disease research is hampered by the need to inactivate pathogens within tissue samples before analysis. Current inactivation techniques utilize a stepwise process of freezing excised tissues, inactivation via UV, X-ray, or gamma irradiation, then processing samples for MSI. This is a laborious and time-consuming process and is not efficient for studying dynamic cellular interactions during time of tissue harvest. We hypothesize that alternate inactivation strategies can be conducted “on-slide” reducing the delay from tissue sample collection to MSI and improving the capture of dynamic interactions. In this study, we used *Mycobacterium bovis* Bacillus Calmette-Guerin (BCG), an attenuated *Mycobacterium* that can be manipulated in standard laboratory conditions to test our hypothesis. We tested chemical and UV on-slide inactivated methods and found promising preliminary results using UV exposure on-slide. Our aim is to develop a protocol using BCG as our model organism, expand our protocols for use with virulent *M. tuberculosis*-infected tissue samples and eventually other high containment pathogens.

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R182 Exploring the Neuroinflammatory Effects of Direct Exposure to Eucalyptus Wildfire Smoke PM2.5 on C57Bl/6 Mouse Glial Cells

Alexandra de Garay

Julie Moreno

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Research Poster

As the frequency and intensity of wildfires increase globally, exposure to wildfire smoke (WFS) is a growing concern, particularly in regions with high annual fire and smoke impacts. While much research has focused on the pulmonary system, gaps remain in understanding how inhaled WFS affects peripheral systems. Understanding the direct effects of WFS particulate matter smaller than 2.5 micrometers in aerodynamic diameter (PM2.5) on the brain is crucial for evaluating broader long-term public health impacts. Other types of PM2.5, such as urban pollution and agricultural dust, have been shown to cause neuroinflammation and neurotoxicity. We hypothesized that glial cells exposed to WFS PM2.5 in vitro would show increased inflammatory cytokines, oxidative stress, and mitochondrial dysfunction. We exposed primary mixed glial cells to 0.01 µg/mL, 0.1 µg/mL, 1 µg/mL, and 10 µg/mL of WFS PM2.5 for 6, 12, and 24 hours, assessing cell viability with CellTiter Blue assays. No significant changes in cell viability were observed. Moving forward, we will investigate inflammatory pathways and key markers of inflammation (TNF- α , IL-6, IL-1 β), oxidative stress, and mitochondrial function using qPCR and ELISAs. These future experiments may reveal specific cellular responses triggered by eucalyptus WFS PM2.5 exposure, providing insights into mechanisms of neuroinflammation and neurotoxicity.

R193 Bridging the Gap: Understanding Scientific Knowledge of Dog Behavior Among Volunteer College Service Dog Raisers

Haley Deison

Lucas Guerrero

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Research Poster

Each year, Canine Companions places approximately 350 trained service dogs with individuals in need, supporting its mission to enhance the quality of life for people with disabilities. However, these placements represent just 1% of the 61 million Americans living with a disability, leaving many without access to a service dog. Volunteer college student puppy

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raisers play a pivotal role in shaping the future of these service dogs by providing foundational training from 8 weeks to 16 months of age. However, it is unclear how well these volunteers understand the scientific principles behind canine behavior and training. This study includes a survey which explores college puppy raisers' knowledge of concepts like operant conditioning, socialization, and reinforcement-based techniques, as well as their access to educational resources on canine behavior. The anticipated results suggest that while volunteers are dedicated to training, there may be gaps in their scientific understanding of why specific methods are used. Addressing these gaps is crucial, as scientifically informed training is fundamental to preparing service dogs for life-changing tasks, such as operating lights, retrieving items, and offering emotional support. By identifying knowledge gaps, this research aims to inform the development of accessible educational materials for puppy raisers. These materials will bridge the divide between scientific advancements and practical training methods, increasing accessibility to prospective puppy raisers and fostering better outcomes for both trainers and recipients. Ultimately, enhancing the scientific understanding of puppy raisers strengthens the effectiveness of service dog programs and expands the reach of Canine Companions' mission.

R175 Insect-Specific Virus Presence in Mosquitos at the Center for Vector-Borne and Infectious Diseases at CSU

Lila Domenico

Gregory Ebel and Kaitlynn Williams

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Research Poster

Insect-specific viruses (ISVs) infect arthropod cells, like mosquitoes, but not vertebrate cells. Previous research shows that ISVs decrease the growth of other arboviruses like West Nile virus when mosquitoes are coinfecting. Because of this ability to decrease arboviral growth and their inability to replicate in vertebrate cells, future research is expanding on biocontrol applications of ISVs. With research into arboviruses being completed at facilities like the Center for Vector-Borne and Infectious Diseases (CVID), ISV presence in the mosquitoes used to study these diseases could impact the results dependent on infecting mosquitoes with arboviruses. We determined which ISVs are commonly found in mosquito populations and used RT-PCR to screen multiple colonies of mosquitoes in the insectary at CVID. We screened for *Culex flavivirus*, *Aedes flavivirus*, *Anopheles flavivirus*, Cell fusing agent virus, Phasi Charoen-like virus, Kamiti River Virus, Eilat Virus, and Calbertado virus. We collected mosquitoes from different colonies of *Aedes triseriatus*, *Aedes aegypti*, *Aedes albopictus*, *Culex quinquefasciatus*, and *Culex tarsalis* from the insectary for screening. RNA was extracted from homogenates for each

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species and we will run RT-PCR on each sample using previously published primers for common ISVs. Knowing the presence and prevalence of ISVs in mosquitoes in the insectary at CVID could help establish our ability to obtain accurate results from future experiments on arboviruses.

R187 Battle of the Sexes: The Effect of Biological Sex on Mycobacterium tuberculosis Infection and Protection

Holland Eddy

Karen Dobos

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Research Poster

Around the world and across species, viral and bacterial infections commonly have greater effects on males than on females. Specifically regarding Mycobacterium tuberculosis, males typically have longer infection times, greater side effects, and higher mortality rates as opposed to females. Additionally, the BCG vaccine (Bacille Calmette-Guérin) appears to be more effective in females than males. We hypothesize this to be the case because males generally have higher levels of inflammatory cytokines such as TNF- α , IL- β , and IL-6. These cytokines are primarily responsible for inflammatory responses that assist in fighting off infections such as Mycobacterium tuberculosis. However, a more significant increase in inflammatory cytokines found in M. tb infected male mice has been found to create a “non-protective inflammatory response,” as opposed to a protective immune response. This research studies Mycobacterium tuberculosis in a guinea pig model of infection and its effects concerning the sex of the guinea pig. Twenty female and twenty male guinea pigs were studied, with ten of each sex in a vaccine and control group. Serum samples were taken at five time points in the study: 1) at the beginning of the study, 2) after vaccination or buffer-only injection, 3-5) after initial challenge with Mycobacterium tuberculosis, forty days post-challenge, and at eighty days post-challenge. These serum samples have undergone Albuvoid filtration to deplete the albumin in samples, and BCA assays were conducted to prepare samples for proteomics. Samples were digested with trypsin, and peptides were extracted for proteomics analyses using liquid chromatography in tandem with mass spectrometry (LC-MS). Analysis of the proteome is underway. We anticipate that our studies will further elucidate the contribution that differences in male and female immune responses have on the control and severity of TB.

R172 Canine Endometrial Organoids as a Model to Investigate MSC - Derived Extracellular Vesicle Therapy for Enhanced Fertility in Bitches with Cystic Endometrial Hyperplasia

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Charissa Ehresman

Fiona Hollinshead & Melinda Meyers

College of Veterinary Medicine and Biomedical Sciences

Research Poster

Organoids are a three-dimensional cell culture model that represent the in vivo environment and can be affected by hormones. This project utilizes organoids as an in vitro model of diseased canine endometrial tissue in order to examine the diseased tissue and test a potential treatment for the disease. The objective was to show the benefit of extracellular vesicles (EVs) at reducing inflammation, the leading symptom of cystic endometrial hyperplasia (CEH), which affects the uterine lining and pregnancy. EVs are nanoparticles secreted by cells that can be used both in cell culture and dosed in vivo. In this project, EVs are assessed for reducing inflammation in organoids developed from canine endometrial samples with CEH. Our results showed a statistically significant decrease in inflammatory markers when using PCR after EVs were added to CEH organoids. This finding can be further used in research regarding fertility of diseased subjects.

R153 Tauopathy Distribution in Companion Animals and the Search for an AD Model

Aidan Flanagan

Abdullatif Alsulami and Julie Moreno

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Research Poster

Neurodegenerative disorders such as Alzheimer's Disease (AD) are an ever-present issue, especially in an aging population. Neurodegeneration in general follows a common pathology in most organisms. Aggregation of amyloid beta (A β) plaques and hyperphosphorylated-Tau (P-tau) tangles lead to glia cell activation, neuronal inflammation and eventually breakdown of synapses. While common model organisms such as rodents can be induced with neurodegenerative pathologies, they are missing environmental variation and genetic diversity. When looking for an AD model organism, differences in environmental factors, genetics and disease pathology are all considered. This can be the advantage of having a companion animal model. They live with us, are exposed to the same environmental factors and have considerable genetic diversity. Since mild to severe age-related cognitive dysfunction is found in both felines and canines (FCD and CCD respectively), companion animals are natural and most accurate models for AD research. We hypothesize there is an increase with age in both gliosis and P-tau in the frontal cortices of brains from FCD and CCD animals. To determine this correlation, we utilized immunohistochemistry (IHC) staining of glial marker Iba1, and astrocyte markers S100 β

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and GFAP. Ten of each companion animal were sampled and P-tau pathology was investigated by positive cell counting and glial morphology analysis. Unlike what was expected, glial activation and P-tau accumulation does not always correlate with age. It was concluded that larger sample sizes and different antibodies could determine other sites of gliosis and P-tau pathology to find a stronger correlation.

R195 Evaluating Feline Susceptibility to Influenza Pan A Virus (IAV): A Retrospective Approach

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Mary Nehring

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Research Poster

Influenza A Virus (IAV) has historically been severely understudied within the family Felidae. In the early 2000s, felids were believed to be resistant to IAV, specifically Avian Influenza (AIV), with no peer-reviewed papers reporting AIV infections from 2010 to 2014, except for one publication in 2013. It is now understood that felines are susceptible to IAV, however, research on viral-host interactions and exposure is limited. This knowledge gap has become increasingly evident following the first detection of highly pathogenic Avian Influenza (HPAI H5N1) in dairy cattle in the U.S. in March 2024. Since then, reports of severe H5N1 viral infections in domestic, barn, and feral cats have escalated. Given the proximity between felines and humans, and AIV's spillover potential, establishing the broad prevalence of IAV in domestic cats will prove vital to understanding the increase in mammalian susceptibility. To investigate this, 150 feline sera samples were collected from May to August 2024 for Influenza Pan A-specific antibody screening using a competitive ELISA. An additional 200 archived feline sera samples dated between 2012 and 2013 from varying regions across the U.S. were tested. Future analysis between the pre- and post-outbreak samples will help determine whether the absence of reported feline IAV infections in the early 2010s was due to a difference in susceptibility or a lack of surveillance and awareness. This will also help provide insight into the evolution of AIV's impact on mammalian hosts.

R158 Optimizing Axonal Transport Imaging of Alpha-Synuclein Prions

Amy Geores

Amanda Woerman

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Research Poster

Synucleinopathies are a group of neurodegenerative disorders characterized by the presence of aggregated α -synuclein that spreads through a prion mechanism of disease. Each synucleinopathy is caused by α -synuclein misfolding into a different conformation, or strain. For progressive neurodegeneration to occur, α -synuclein prions must spread from cell-to-cell in a circuit. Replication of α -synuclein prions must happen within neurons and the characterization of the transport of α -synuclein prions is unknown. To observe α -synuclein prions move within transgenic mouse dorsal root ganglia neurons, I have labelled recombinant α -synuclein fibrils with a pHrodo green dye. I will optimize imaging conditions of pHrodo green and Alexa Fluor 594 co-labelled α -synuclein being transported and create an analysis pipeline for this transport data. To confirm uptake of α -synuclein prions into neurons, I have labelled neuronal cell bodies with Hoechst nuclear dye and used the Colocalization Finder tool in ImageJ to analyze the colocalization of pHrodo green labelled α -synuclein fibrils and neuronal cell bodies. I found that after 1.5 hours, the majority of neurons had uptaken fibrils. To investigate the cytotoxic potential of Hoechst, I used three different concentrations of Hoechst and a DMSO control in four wells of neurons for one week to optimize a subcytotoxic level of the dye. I used ImageJ to compare the difference in total number of cells on the start and end point of the experiment. Time-lapse images will be used to create a movie of the axonal transport of α -synuclein and the KymoAnalyzer tool will be used to generate kymographs and gather parameters of transport. By optimizing the imaging of α -synuclein prions moving within neurons, I expect to be able to differentiate α -synuclein strains via axonal transport.

R183 A Novel Gene-targeted Model for Studying Chronic Wasting Disease

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College of Veterinary Medicine and Biomedical Sciences

Research Poster

Chronic wasting disease (CWD) is a prion disease which affects cervids worldwide. To investigate this disease in a laboratory setting, our group has developed gene-targeted (Gt) mice that encode the cervid prion protein (PrP) and recapitulate the native strain properties of CWD. However, our current Gt model maintained on the inbred FVB background, has pathology not related to prion disease experimentation. To address this issue of atypical illnesses, we generated F1 hybrid mice, a cross between the inbred FVB and Black 10 (B10) lines. We monitored the relative health, life cycle, and pathology during natural aging of these mice. We observed hybrid mice live longer lives without non-prion related pathology. We were interested

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to see if changing the mouse line would modify prion disease outcome, so we inoculated the mice intracerebrally (ic) and intraperitoneally (ip) to compare them to their progenitors. Results showed almost identical CWD disease progression and onset of neurological signs in all three murine lines. The hybrid mice had similar accumulation of splenic tissue, levels of CWD prion in the CNS, and type of deposition as their FVB progenitors. Importantly, these findings are in agreement with our group's recent report that disease outcomes following ic and ip transmissions are distinct, thus the peripheral inoculation into the F1 hybrids recapitulate native CWD strain properties. While further investigation is required to determine if these F1 hybrids are efficient prion disease models for other mammalian species, we've established that they are a robust experimental system from studying CWD.

R186 A New Pathogen in the MTb Complex: Protein Characterization of *Mycobacterium mungi*

Kendall Goldmann

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College of Veterinary Medicine and Biomedical Sciences

Research Poster

Originally reported as *Mycobacterium tuberculosis* (MTb) in 1999, *Mycobacterium mungi* is a novel MTb Complex pathogen which infects banded mongoose in Botswana and Zimbabwe. It causes lesions in multiple areas, including the upper respiratory tract, anal glands, spleen, liver, and lymph nodes. *M. mungi* is also unable to be cultured in vitro. Little research has been previously done on *M. mungi* since its official discovery in 2010. However, further research on this organism is incredibly important due to the pathogenic nature of *M. mungi* and possibility of spillover due to how close the banded mongoose resides to humans. This exploratory study looks at methods that *M. mungi* proteins can be characterized and identified. After analysis of the samples with mass spectrometry, the next steps in this study include optimizing identification of these proteins and improving the processes in which the results are derived from. Furthermore, identification of *M. mungi* proteins and peptides can help future studies create methods of isolation for this bacterium.

R168 The DNA Fiber Assay: An insight into accurate DNA replication

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Research Poster

Precise DNA replication is critical for all living organisms. Every day, our cells divide and undergo semi-conservative DNA replication to generate identical daughter cells. However, many external and internal factors induce replication stress and pose a threat to the accuracy of the genetic material passed down to daughter cells. To overcome DNA replication stress, our cells have adapted mechanisms to maintain precise DNA replication and avoid disease-promoting mutations. To understand how cells respond to DNA replication stress, we must utilize specialized methods. We use the DNA fiber assay to analyze the dynamics of DNA replication at a single-molecule level. In the DNA fiber assay, exponentially growing human cells are labeled with two thymidine analogs, harvested, dropped on a microscope slide, and lysed. The slide is tilted at a slight angle, and, with the help of gravity, the DNA is then stretched along the slide. Following immunostaining, we can visualize the labeled DNA with fluorescence microscopy. Analysis of the imaged DNA results in a quantification of DNA replication speed and stability. Through this experimental approach, we can compare replication dynamics in various cell types, as well as how different proteins affect replication. Additionally, the DNA fiber assay allows us to analyze the condition of human cells that have been treated with chemotherapeutic drugs, which typically induce replication stress. Our overarching goal is to employ the DNA fiber assay to understand the mechanisms and control of DNA replication, how cells overcome DNA replication stress, and how this translates to human health.

R188 Optimization of Mycobacterium Bovis BCG Tuberculosis Vaccine: Formulation and Preservation Through Cryoprotectant and Freezing Method Evaluation

Mali Gomez

Karen Dobos

College of Veterinary Medicine and Biomedical Sciences

Research Poster

Now more than ever, it is essential to advance biomedical and microbiology research to provide outreach and improved healthcare solutions to underrepresented communities. One such effort includes optimizing the Bacillus Calmette-Guérin (BCG) vaccine, the only available vaccine for Tuberculosis (TB), to enhance its potency and stability for long-term storage. We hypothesize that a potent BCG formulation can be cultured using a bioreactor and stabilized under validated freezing and storage conditions. Additionally, we propose that the use of different cryoprotectants—including formulation buffer-control, 20% glycerol-control with tween, 5% dimethyl sulfoxide (DMSO), 5% trehalose, 5% sucrose, and 1.5% monosodium glutamate (MSG)—will reveal the most effective formulation for maintaining BCG viability.

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Furthermore, we will assess the impact of various freezing methods—normal freezing, slow freezing, and lyophilization freezing—on the preservation of *Mycobacterium bovis* BCG. To determine the best cryoprotectants and freezing methods for BCG vaccine reproducibility and viability, we will compare bacterial growth over time in culture using total viable counts and total bacterial counts. We anticipate that specific cryoprotectants will enhance BCG viability, with one or more conditions significantly outperforming others in maintaining bacterial potency during long-term storage. Similarly, we expect that a particular freezing method will emerge as the most effective strategy for BCG preservation. These findings could improve TB vaccine distribution by extending BCG shelf life and accessibility in resource-limited settings.

R208 Service Dogs in Science – How do we make Laboratories more Accessible for disabled individuals with Service Dogs?

Jessica Gray

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Research Poster

Service dogs serve an extremely crucial role in many ways including tasks that help mitigate their handlers' disabilities. They give their handlers their freedom and independence back. Service dog handlers in STEM are like any other scientist; however, science itself has historically been underrepresenting of individuals with marginalized backgrounds, including disabilities. Science laboratories have offered their own wave of challenges for students with a variety of disabilities, but the question is - How can we shift our perspectives to make laboratories more accessible for students with service dogs? One method we can use is inclusive science communication, which can help bridge the gaps and address past marginalization. Following inclusive science communication practices, I used ethnographic approaches, including interviewing other service dog handlers and collecting research articles to effectively understand how labs can be more accessible for students with service dogs. As a result of the information I collected, I concluded that developing a protocol and more education on the topic will be crucial to making sure that disabled scientists have a seat at the bench. This protocol will outline the personal protective equipment that is necessary to keep service dogs safe. Overall, science is for everyone; and through inclusive science communication, we can make scientific spaces accessible to all.

R212 Discovering the circulating milieu in microglia of men with hypogonadism

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Research Poster

Testosterone (T) plays a crucial role in regulating physical health during aging and disease states across all physiological systems. Evidence suggests that low serum testosterone increases the risk of cardiovascular diseases (CVD), Alzheimer's disease, and related dementias (ADRD). However, the mechanisms by which low T contributes to the development and/or progression of CVD and ADRD are not fully understood. Thus, in this present study, we plan to evaluate the effects of varying circulating T levels on neuroinflammation (a key characteristic of ADRD). We hypothesize that serum from middle-age and older (MA/O) males with low endogenous T levels, compared to MA/O with normal T levels, will cause neuro-inflammatory activation of microglia. To test this hypothesis, we will use human microglia and brain microvascular endothelial cell lines cultured in a 12-well plate + a transwell insert format, which will mimic the blood-brain-barrier (BBB). By treating cells in this model with serum from human research participants (with low or normal T), we will be able to evaluate T-related effects on neuroinflammatory activation of microglia. Cells will be exposed to patient serum for a 48-hour incubation period, after which they will be lysed and collected for analysis. The proposed experiments will increase our understanding of the underlying effects of circulating T and/or circulating proteins associated with T levels on microglia, which are key cell types involved in neuroinflammation and ADRD. These proof-of-concept experiments will provide critical insights into how low T and influence microglia, advancing our understanding of neuroinflammation and guiding potential therapeutic strategies.

R173 Finding the Purrfect Solution: An Evaluation of Sterilization Methods in Cats

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Research Poster

There are millions of domesticated cats in the world and most of them are strays. The growing population of stray cats poses a public health risk and contributes to the endangerment and sometimes extinction of various small wildlife species that the cats hunt. Cat overpopulation also raises ethical concerns due to poor welfare and quality of life. Furthermore, many owners seek alternative, non-surgical methods of fertility control for many reasons such as to avoid some health effects, possibility of complications, and concerns related to cost. This review analyzes different methods of fertility control available in cats to help determine the best options for both owned and feral cat populations. Based on current research, surgical

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procedures such as ovariectomies, ovari hysterectomies, orchidectomies, and cryptorchidectomies may be better suited for stray cat populations until other options such as immunocontraceptives or anti-Müllerian hormone transgene prove to work for much longer periods of time. Fertility control options such as progestins, melatonin, and Deslorelin may be better options for cats meant for breeding purposes because these are easily reversible and maintain behaviors associated with the hormonal cycle. For cats that clients do not intend to breed, the anti-Müllerian hormone transgene and surgical procedures such as ovariectomies, ovari hysterectomies, orchidectomies, and cryptorchidectomies may be the best options.

R167 Using Genetic Approaches to Identify Antibiotic Pathways in *Paenibacillus apiarius* JH21

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Research Poster

As instances of antibiotic resistance increase, the search for novel antibiotics and a better understanding of antibiotic production pathways in bacteria is more important than ever. A novel strain of *Paenibacillus apiarius* (designated JH21) was isolated from Horse Tooth Reservoir and tested for its ability to produce antimicrobial substances. An antibiotic extraction was completed, and a disk diffusion assay against multiple bacterial strains was performed to find the spectrum of antimicrobial activity. Whole genome sequencing was completed to identify the bacteria and pathways involved in antibiotic production. After assembly, the genome was run through a program called antiSMASH to identify biosynthetic gene clusters (BGCs) that could be responsible for the antimicrobial production. However, this program did not find any concrete matches for antimicrobial pathways. After this, attention was turned to an antibiotic called paenibacterin which had a very similar spectrum of targets to the one produced by *P. apiarius* JH21. A nucleotide BLAST was used to compare the paenibacterin gene cluster to the *P. apiarius* JH21 genome which revealed high similarity between the two. In an effort to conclude whether this strain is producing paenibacterin, chemical analysis of the antibiotic extract will be performed. An electroporation protocol for *P. apiarius* JH21 is also being developed so that foreign DNA can be used to disrupt the antibiotic synthesis pathway, to see if there is more than one antimicrobial substance being produced.

R205 Dietary Conditions and Their Effect on miR-137 Expression in *D. melanogaster*

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Nicholas Hall and Nathan Pettid

Susan Tsunoda

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Research Poster

miR-137 is a microRNA (miRNA) that has been found to have regulatory effects in many species, including humans, mice, and *Drosophila melanogaster*. miR-137 has predominantly been studied for its pathways related to neuronal proliferation and differentiation, and abnormalities in its function have been shown to lead to psychiatric disorders, such as schizophrenia, major depressive disorder, and autism spectrum disorder. One newer regulatory pathway that has been identified for miR-137 is in metabolic homeostasis, wherein a depletion of miR-137 leads to starvation resistance and a lack of insulin signaling in *D. melanogaster*. This pathway of miR-137 activity is relatively understudied, and it is still unknown whether or not environmental factors can regulate miR-137 levels in the brain. This study aims to discover the effect of diet on levels of miR-137 in the heads of *D. melanogaster*. Diets containing high sugar, protein, and fat, were fed to *D. melanogaster*, and levels of miR-137 in the heads of these specimens were subsequently analyzed by RT-qPCR.

R203 Haploinsufficiency of the autism-associated δ -catenin mutation is sufficient to induce social dysfunction in mice

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Seonil Kim

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Research Poster

Social behavior is essential to survive for many species, and various mental disorders have social impairment as a primary symptom. Research suggests that synaptic activity and signaling can regulate social behavior. However, the links between synaptic regulation and social behavior are not completely understood. δ -catenin functions as an anchor for the glutamatergic AMPA receptor (AMPA) to regulate synaptic activity in excitatory synapses. Mutations in the δ -catenin gene are found in autism patients from multiple families and induce a loss of δ -catenin functions at excitatory synapses, which is thought to be the etiology of autism in people. In fact, patients heterozygous for deletions or loss-of-function variants of the δ -catenin gene exhibit a variety of features of autism. Therefore, δ -catenin heterozygous mutant is a valuable loss-of-function model to investigate ASD pathophysiology caused by δ -catenin haploinsufficiency. Here, we used mice harboring one copy of human autism-associated δ -catenin missense mutations, a glycine 34 to serine (G34S), to address whether δ -catenin

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haploinsufficiency that mimics the human condition is sufficient to induce social dysfunction in animals. To test this, the reciprocal social interaction test to examine social interaction between two freely moving mice was performed. We found that the total number of contacts and total duration of contacts were significantly reduced in both female and male G34S heterozygous (HET) mice. Furthermore, synaptic δ -catenin and AMPAR subunits (GluA1 and GluA2) levels were significantly reduced in the cortex of HET mice. However, the open field test showed normal locomotor activity and anxiety levels in these mice. Therefore, we discover that δ catenin haploinsufficiency is sufficient to induce social dysfunction in mice

C9 A Student's Perspective of the Engaged Learning Approach for a New Class on Community Engagement and Environmental Public Health

Alex Holmes

Maggie Clark

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Community Engagement Poster

Evidence demonstrates the need for and benefits of engaged initiatives within public health to enhance community wellness and resilience to climate change related threats. However, there is an educational gap regarding engaged learning for students planning to enter the environmental public health workforce. Community engagement as a pedagogical strategy leads to students reporting higher scholastic satisfaction, demonstrating higher academic performance and critical thinking skills, presenting a greater ability to apply course learnings to real-world situations, and possessing enhanced professional skills such as leadership, teamwork, and cultural competence. As a student in an experimental course that was informed by environmental and public health professionals, I will present learning objectives and effectiveness from an undergraduate perspective. The learning objectives I will describe include: (1) appreciate how knowledge of global climate change and health translates to needs and actions in local contexts; (2) recognize a continuum of civic engagement and action and identify models of community engagement; (3) develop an understanding and practice of resilience, cultural humility and critical reflection; (4) understand and practice varying approaches to team science, science communication, civil discourse, and public deliberation. I will discuss strengths, limitations, and personal insights of a new course designed to introduce students to the inherent complexity and challenges of community engagement work and to equip them to participate and learn effectively in this context.

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R155 Skn-1, Nrf homolog, Role in Cannabidiol Neuroprotective Properties in *Caenorhabditis elegans*

Ava Holzer

Abdullatif Alsulami and Julie Moreno

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Research Poster

Cellular stress plays a critical role in neurodegeneration, yet the mechanisms by which cannabidiol (CBD) influences stress response pathways remain unclear. Oxidative stress results from an imbalance between reactive oxygen species (ROS) and the body's antioxidant defense system, which is regulated by transcription factors like Nrf-2. While CBD has been linked to oxidative stress regulation, its interaction with skn-1, the *C. elegans* homolog of Nrf-2, remains underexplored. This study investigates CBD's role in modulating oxidative stress responses in *C. elegans*. Skn-1 has three isoforms: skn-1b and skn-1c regulate antioxidant defense, while skn-1a plays a role in proteostasis by regulating proteasome activity. Using a worm model, we will assess neuromuscular function through head thrash assays to determine whether CBD enhances skn-1 activation under oxidative stress conditions. The WormLab system enables precise, automated tracking of locomotion, improving our ability to quantify stress responses. We hypothesize that CBD activates skn-1 pathways to enhance oxidative stress defense mechanisms. Understanding this interaction will address gaps in knowledge regarding CBD's role in cellular stress and provide insight into its potential as a neuroprotective agent. By elucidating how CBD influences oxidative stress resilience, this study contributes to broader research on therapeutic strategies for neurodegenerative diseases.

R213 Advancing Latent Tuberculosis Diagnosis: A Comparative Study of Exosome Enrichment Strategies

Pareese Jalal

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Research Poster

Exosome isolation from human serum is a critical step in identifying biomarkers for *Mycobacterium tuberculosis* (Mtb), particularly for early detection of asymptomatic infections. This study compares the PreOmics EV enrichment method to the lab's standard protocol to evaluate their efficiency in isolating exosomes and identifying Mtb-related peptides. It was hypothesized that the PreOmics method would show inferior performance relative to the lab's

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established method, resulting in fewer identified peptides associated with Mtb. PreOmics claims that their magnetic bead-based approach enriches for less abundant proteins in the sample, which could influence the types and quantities of exosomal proteins recovered. To assess enrichment efficiency, bicinchoninic acid (BCA) assays were performed for protein quantification, and nanoparticle tracking analysis (NTA) was conducted to determine particle concentration and size distribution in both sample sets. Although mass spectrometry results are being analyzed, preliminary data from the BCA and NTA assays suggest differences in protein content and particle characteristics between the two methods. This research is part of an ongoing study aimed at identifying novel biomarkers for Mtb infection in individuals without noticeable symptoms, with the potential to enhance early diagnosis and improve treatment outcomes for latent tuberculosis infections.

R164 Comparing qPCR Detection of *Mycobacterium leprae* in Human and Armadillo Samples

Ria Janapati, Bettina Broeckling, Brendan Dosenbach, and Mary Jackson

Charlotte Avanzi

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Research Poster

Diagnosing leprosy is based on three cardinal signs: skin lesions, nerve thickness, and identifying the causative agent, *Mycobacterium leprae*. A quantitative polymerase chain reaction (qPCR) targeting the 36x repeated region RLEP is currently the most sensitive method for pathogen detection. This qPCR requires a molecular laboratory setting and temperature-sensitive reagents. Moreover, leprosy is endemic in communities lacking immediate access to laboratories, leaving a need for rapid testing in the field. Biomeme has developed a portable, rechargeable battery-operated thermal cycler that is controlled by a smartphone and uses unrefrigerated, lyophilized reagents. This project aims to validate the qPCR assay using Biomeme materials with the same quality as the laboratory's gold standard. We optimized the qPCR assay with Biomeme reagents using positive control DNA, human clinical samples, and armadillo samples. Standard curves using a linearized RLEP plasmid showed 100% similarity between the Biomeme and the gold standard. We extracted DNA from skin biopsies using the Qiagen QIAmp prep kit, and used the CFX Biorad thermal cycler to perform the gold standard qPCR to compare with the Biomeme Franklin instrument. The standard curves using the two assays showed 100% similarity to each other. qPCR was performed on 50 human skin samples, and 10 armadillo ear/spleen samples. For the humans, both assays showed 5 negative samples, 39 positive samples, and 6 samples with discordant results. For the armadillos, both assays showed 1 negative sample, 8 positive samples, and one result was discordant. The linear

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regression showed a strong correlation between the two assays, suggesting that the Biomeme assay is as effective as the CFX Biorad.

R163 Learning Traps: How Attentional Differences Influence Recognition Task Performance

Eva Jane Brewer

Carol Seger and Joseph Martis

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Research Poster

Learning traps occur when individuals fixate on specific cues relevant to task outcomes while neglecting alternative strategies. Li, Gureckis, and Hayes (2021) suggested that attentional differences in approach-avoidance tasks under frequent loss versus gain conditions may mitigate learning traps. However, direct attention measures were not included. To address this gap, our study incorporated a recognition task as a proxy for attentional allocation. After an initial learning phase, participants completed a test phase in which they decided whether to approach or avoid stimuli and subsequently identified them as new or old. By introducing transfer stimuli, we assessed attention distribution and rule generalization. Learning traps were examined through participants' reliance on either a suboptimal single-dimension rule or a more effective two-dimension rule when making approach-avoid decisions. Results revealed no main effect of group performance on recognition trials; however, an interaction emerged between group and rule use. Specifically, participants in the gain condition who adopted the optimal two-dimension rule were more likely to recognize new stimuli compared to those who relied on a single-dimension rule. These findings provide insight into the role of attentional mechanisms in the development and persistence of learning traps, offering potential strategies for mitigating cognitive biases.

R189 Glial-mediated neuronal viability in a novel in vitro model of chronic pain

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Katriana Popichak

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Research Poster

Chronic pain (CP) affects 20% of people worldwide. While current understanding of pathological pain revolves mostly around neuronal mechanisms, supporting peripheral cells are often overlooked in CP studies. Macrophages regulate inflammatory response in the peripheral

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immune system, while microglia, the macrophage of the central nervous system (CNS), protects neurons. Non-neuronal cells, astrocytes and microglia, and peripheral macrophages play an important role in the neuroinflammatory process, as shown in recent CP studies. Microglia and astrocytes mediate neuroinflammation regulated by the transcription factor, nuclear factor-kappa B (NF- κ B), capitulated in CP and other pathological pain conditions. Current in vivo studies demonstrate Complete Freund's Adjuvant (CFA) to be an effective model for CP, however, there are currently no established in vitro models. Thus, we hypothesize that an in vitro CP model utilizing CFA will demonstrate increased inflammatory signaling and oxidative stress, promoting neuronal cell death regulated by both macrophages and glial cells. To test this hypothesis, we measured cell viability of N2A cells, an immortalized neuronal cell line, treated with CFA and saw a dose-dependent decrease in viability upon exposure. Contrary to the above hypothesis, N2A cells exposed to glial and RAW-conditioned media failed to demonstrate cell death, suggesting a unique mechanism of neuroinflammation. Moving forward, we will measure NF- κ B-regulated inflammatory gene expression of N2A cells exposed to conditioned media and direct treatment to further reveal how peripheral immune response to CP promotes neuroinflammation. Taken together, these data elucidate cellular mechanisms behind CP-associated inflammatory signaling pathways, potential targets for more effective therapeutic treatments.

R194 Unraveling the Seizure Spectrum: Differentiating Between Psychogenic and Epileptic Seizures

Kennedy Jones

Mentor name(s) (Calibri 12)

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Research Poster

Psychogenic non-epileptic seizures (PNES) present a unique clinical challenge, sitting at a crossroads of neurology and psychiatry. This project explores the potential pathophysiological and psychological framework of PNES, compared to epileptic seizures to outline the differences and similarities between these two distinct conditions. This project examines the physical manifestations of PNES, the diagnostic criteria, and factors contributing to the misclassification of this condition. Additionally, this will investigate the root causes of PNES, particularly the role of psychological stress, trauma, and mental health disorders in their onset. Key research questions focus on understanding the mechanism of PNES both physiologically and psychologically, identifying the criteria for precise diagnostic practices, and exploring the complex relationship between mental health and seizure manifestations. By analyzing current literature on both PNES and epilepsy, this work aims to clarify the boundaries between

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neurological and psychiatric diagnoses, while also addressing the stigma associated with PNES. The findings are expected to inform future research directions, diagnostic approaches, and treatment strategies, ultimately expanding the literature exploring the understanding and management of PNES in medical and psychological contexts.

R169 Detection of prions in skeletal muscle of gene-targeted mice infected with Nordic CWD

Madeline Judson

Diana Lowe

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Research Poster

Prion diseases are a group of neurodegenerative disorders that effect both humans and animals, caused by accumulation of misfolded prion proteins. Chronic wasting disease (CWD) a highly infectious prion disease of cervids was first identified in Colorado in the 1960s but has since spread to over half the states in the US and has been identified in Nordic countries. For North American strains of CWD, the rapid spread of disease is a result of the proliferation of prions to the environment and other tissues. The primary concern regarding the accumulation of prions, is the zoonotic potential of this disease when tissue is consumed. Within the CWD cases identified in Nordic countries, four were isolated from moose found in a similar region in Sweden. To characterize Swedish moose CWD isolates, we infected our gene-targeted mice with these isolates, which express cervid prion protein at typical physiological levels and recapitulate native CWD strains. Muscle tissue collected from infections of these moose CWD into these mice were then homogenized and assayed via Real-time Quaking-induced Conversion (RT-QuIC) which identifies prion proteins. We found that for the first Sweden case, accumulation in the muscle tissue was relatively consistent, whereas Sweden-2 and 3 showed no positivity for proliferation to the muscle. Sweden-4 was found to be much more sporadic in its muscle positivity. These findings are vital as they show that there is some adaptation of proliferation occurring in these Sweden Moose increasing the risk of potential exposure for humans who may consume said muscle tissue.

R166 Complementation of CRISPR-Cas9 Edited Phage P68 Knockouts

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Research Poster

Bacteriophages (phages) are viruses that only infect and kill bacteria. They have been used to treat antibiotic-resistant bacterial infections. Our laboratory has been studying phage P68 of *Staphylococcus aureus* as a possible phage for phage therapy. We are making knockouts in each phage gene to determine which genes are needed and which are not for the phage to replicate and make phage particles. Once nonessential genes are identified, they can be replaced with genes that make lethal products, increasing the likelihood of success for phage therapy. If we knock out essential phage genes and introduce these mutant phages into *S. aureus*, replication of these phages will not occur, and no phage will be recovered. If phages aren't recovered, it is impossible to know whether the experiment didn't work or if an essential phage gene was knocked out. To solve this problem, my research project is to make *S. aureus* strains that contain a copy of each intact working phage gene on a plasmid to use as a positive control. Phage mutants that have an essential gene knocked out will not be able to replicate in *S. aureus*. However, if the essential gene is supplied in *S. aureus* on a plasmid, this will allow the mutated phage to replicate. Phage mutants containing a nonessential gene knocked out will grow in *S. aureus*, either with or without the gene supplied on a plasmid. Using this method, we can identify nonessential phage genes that can be replaced in *S. aureus* phage P68.

R210 Can I Joke About That?

Loti Kedir and Yulia Haileselassie

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Research Poster

As Netflix continues to expand its global reach, the platform's curation of international shows reveals a glimpse into its genre exploration and the audience it's targeting. My study examines how Netflix utilizes its genre classifications to enhance the visibility of international content and cater to diverse viewer preferences. By analyzing the presentation and marketing of various international series, we reveal how Netflix not only promotes cross-cultural storytelling but also appeals to niche audiences seeking authentic narratives from around the world. For me personally, I focused on Netflix's portrayal of genres such as dystopian and thriller based on what was catered to me and studied how these genres are localized to resonate with both regional and global audiences. Netflix's innovative use of algorithms and personalized recommendations plays an important role in shaping viewer experiences and influencing watching habits, which allows for a more customized approach to genre presentation. Furthermore, my study explores Netflix's international shows and how often they reflect themes of class hierarchy, and the representation of class dynamics might serve to create

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tension and talk about societal issues. Overall, by exploring the complexities of genre classification and audience perception, my study focuses on a deeper understanding of how streaming services like Netflix actively shape cultural narratives and redefine global entertainment in an interconnected world.

R157 Influence of bacterial lactic acid on mucosal immune responses after oral vaccination

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Allison Vilander, Gregg Dean, and McKenzie Fletcher

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Research Poster

Lactic acid bacteria (LAB) colonize the gastrointestinal tract and generally confer immune benefits to their host. Because of this, they are emerging as viable vaccine vectors, particularly against mucosal pathogens. LAB secrete high quantities of lactate as a byproduct of their metabolism, and lactate has been increasingly recognized as an immunomodulator, often in an anti-inflammatory capacity. We are studying how lactate metabolism of LAB affects vaccine efficacy using the bacterial platform *Lactobacillus acidophilus*. Using Mirasol® Pathogen Reduction Technology system, we inactivated a recombinant *L. acidophilus* expressing the model antigen ovalbumin. We first verified that inactivation inhibited bacterial growth and reduced lactate metabolism while preserving antigen expression. We then administered the live and inactivated vaccines orally to BALB/c mice and measured lactate concentrations in harvested immune inductive sites (Peyer's patches and ileal lumen contents) using gas chromatography mass spectrometry. We plan to use lactate concentration data to inform optimization of LAB vaccines, especially for mucosal pathogens such as rotavirus for which current vaccines have limited efficacy.

R178 Mycobacterium tuberculosis use of exogenous quinolinate

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John Belisle

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Research Poster

Tuberculosis (TB), caused by *Mycobacterium tuberculosis* (Mtb), remains a leading global health concern. Previous analyses demonstrate increased levels of circulating quinoa intake in patients with active TB and a drop in these levels with treatment. Innate immune cells, such as

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macrophages, infected with *Mycobacterium* spp. or stimulated with IFN-gamma increase the catabolism of tryptophan via the indoleamine 2,3-deoxygenase (IDO1) pathway, resulting in quinolinate production. Thus, elevated levels of circulating quinolinate are consistent with the underlying pathobiology of TB. However, the direct impact of host derived quinolinate on the *Mtb* pathogen remains unclear. Our overall hypothesis is that *Mtb* can use the host-produced quinolinate to achieve a growth advantage. This project aims to test whether *Mtb* can respond to or utilize exogenous quinolinate when added to the culture medium. A bioinformatics analysis of quinolinate metabolism in *Mtb* showed that *Mtb* has the genes for the enzymes to convert quinolinate to nicotinate and nicotinamide, but is also capable of forming quinolinate from aspartate. To assess the growth of *Mtb* in the presence of quinolinate, we are establishing a 96-well plate growth curve using *Mtb* mc26230 transformed with the PTiGc mycobacterial dual reporter plasmid (addgene: #78314). The assay measures bacterial growth by reading optical density at 600 nm and GFP fluorescence. Using this growth curve assay, *Mtb*-PTiGc growth in the presence of quinolinate is being assessed to help elucidate whether *Mtb* benefits from host quinolinate.

R174 Investigating the Role of JIP3's JNK Binding Domain in Glutamate Receptor Transport

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College of Veterinary Medicine and Biomedical Sciences

Research Poster

C. Elegans is a great model organism for studying trafficking of proteins in the neuron due to the ease of visualizing one pair of neurons called the AVA. Since the worm is transparent, we can see specific transport dynamics by attaching a fluorescent marker to the proteins being transported. In our study we will test how mutating the JNK binding domain of JIP3 (UNC-16 in *C. Elegans*), which is an adapter protein responsible for binding vesicles to a kinesin motor, affects transport dynamics in the AVA neurons. Previous work has shown that mutations in JNK signaling lead to delocalization of vesicular cargo, and we hope to demonstrate how deleting the JNK binding domain affects transport dynamics of glutamate receptors. To accomplish this, we will first create an unmutated UNC-16 and a UNC-16 with a deleted JNK binding domain strain, both tagged with a red fluorescent marker called mCherry. We will then cross those strains with a GFP tagged GLR1 receptor to visualize how the transport of GLR1 is affected when compared to a baseline GFP/GLR1 worm. We will use confocal microscopy to visualize how these transport events are affected. While no data has been collected to date, we expect glutamate receptor transport events to decrease in the mutated UNC-16 strain while the

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unmutated strain is expected to remain relatively consistent with our akis-141 wild type controls.

R184 Combinational Treatment of Cannabidiol and Trazadone mitigate proteotoxicity In *C.elegans* beta-amyloid Model

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Research Poster

Alzheimer's disease (AD) is a progressive neurodegenerative disorder that affects memory and cognition. AD is characterized by the accumulation of misfolded proteins that induce proteotoxicity, extracellular amyloid-beta (Ab) plaques and intracellular hyperphosphorylated-tau aggregates, the building block of neurofibrillary tangles (NFTs). Higher loads of Ab and tau lead to neuronal death and loss of cognition in affected patients. There is no proven cure for AD, but studies have shown that reducing the misfolding protein burden could reduce proteotoxicity and progression in AD brains. Cannabidiol (CBD) and Trazadone were both shown to modulate proteotoxicity in AD rodent models. *C. elegans* are a useful model to study aging and AD related diseases due to having a genome homologous with humans, and a short, measurable lifespan. We will test the effectiveness of Trazodone and CBD, separately and synergistically, on AB induced paralysis on animals that model AB in their muscles. We will perform behavioral and biochemical, western blotting, analyses to investigate a possible reduction in AB production in these animals after treatment. Using this data, we can better understand the effectiveness of combined Trazodone and CBD treatments to reduce proteotoxic effects of AB and tau in *C. elegans* to apply to larger models.

R165 Effects of acute stress on midbrain circuitry and innate fear behavior

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Research Poster

The dedicated neural circuitry underlying innate fear mechanisms allows animals to assess and respond to environmental and/or predatory threats, ultimately aiding in their overall survival. Differential threat responses, such as freezing and flight, are thought to be engaged by distinct

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rostrom-caudal columns within the midbrain periaqueductal gray (PAG). Although the cerebellum is traditionally viewed as a motor structure, recent work has suggested it also plays an important role in fear processing, including via direct projections to the PAG. Our lab's preliminary work has demonstrated that exposure to acute stressors alters innate fear responses, raising questions about the underlying mechanism by which stress alters physiology. Stress results in the release of steroid hormones, including corticosterone, which bind glucocorticoid receptors (GRs) throughout the brain. Glucocorticoid receptor activation contributes to plasticity mechanisms and can regulate behavioral and physiological responses to stressful events. The goal of the present study was to quantify glucocorticoid receptor expression within distinct columns of the PAG and cerebellum of wild-type mice and examine whether corticosterone itself is sufficient to drive the behavioral effects observed following acute stress. GR expression was visualized using immunohistochemistry and demonstrated differential expression across PAG columns and layers of the cerebellar cortex. Understanding the role of GRs in the PAG and cerebellum will provide a deeper understanding of how GR activation modulates innate fear circuitry. This work was supported by the CRC Shared Research Program, the National Institute of Neurological Disorders and Stroke R00 (CEV) NS119783, and CVMBS Undergraduate Experiential Learning.

R160 Flow cytometric analysis of prion trafficking in the lymphatic system

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Research Poster

Prion protein (PrP^C) is a constitutively expressed protein in mammalian tissues with the highest concentration present in neuronal and brain tissues. PrP^C can misfold into a pathogenic form (PrP^{Sc}) and induce conversion of normal prion proteins (PrP^C). Aggregation of PrP^{Sc} in the brain leads to cell damage and eventually neurodegenerative disease. Although studies in native and rodent hosts have improved understanding of prion disease progression, early PrP^{Sc} trafficking prior to disease onset are poorly understood. We hypothesize that PrP^{Sc} is trafficked to secondary lymphoid organs shortly after exposure and that peripheral immune cells play a critical role in trafficking. To determine the tissues involved and role immune cells play, we inoculated mice with brain material stained with Carboxyfluorescein succinimidyl ester (CFSE), a fluorescent dye. Using intraperitoneal injection, we observed a small population of CFSE positive cells in the blood and the lymph nodes at 15 minutes post inoculation. CFSE co-stained with the immune cell marker CD45, suggesting that immune cells are trafficking the brain material. Moving forward, we aim to identify specific cell types that are participating in

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trafficking and to explore different routes of inoculation. Insights into how prions are trafficked when they are first introduced to the body will assist to further reveal mechanisms of prion pathogenesis and targets to advance strategies to mitigate protein misfolding diseases.

O26 Mosquitoes and Temperature: A Heated Relationship

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College of Veterinary Medicine and Biomedical Sciences

Oral Presentation

Temperature change is known to affect transmission efficiency of mosquito-borne viruses, particularly those spread by *Aedes aegypti* and *Culex tarsalis* mosquitoes. Previous work showed patterns of decreased oviposition when virally infected adult *Ae. aegypti* mosquitoes were exposed to temperatures varying from typical environmental conditions. It is unclear if this was caused by abnormal temperatures or viral presence. We hypothesized that temperature change negatively impacts oviposition in uninfected blood-fed *Ae. aegypti* and *Cx. tarsalis* mosquitoes due to transcriptional or translational errors in oogenesis. Key reproductive proteins such as vitellogenin may have been altered by temperature, with detrimental downstream effects in egg formation or deposition. We performed experimental trials using ~60 individually housed mosquitoes held at low (18°C), standard (28°C), or high (32°C) temperatures over a 5-day period. 18°C and 32°C data was compared to 28°C. Retained eggs were counted using ovarian dissection, deposited eggs were counted, and any hatching was recorded. Using tissues taken from experimental mosquitoes, we will characterize Vg production and function using qPCR and Western blots. After 5 days, no significant drops in survivorship were observed in either species at all temperatures. When held at 18°C, egg retention increased significantly in both *Ae. aegypti* and *Cx. tarsalis*, determined using a one-way ANOVA ($p < 0.0001$). 32°C did not cause significantly increased egg retention in either species. Hatching rates were significantly lower at 18°C and 32°C ($p < 0.0001$). qPCR and Western blot experiments are ongoing. Understanding how mosquitoes are affected by temperature will inform future vector control and disease mitigation strategies.

R135 A Comparative Analysis of Type 1 Diabetes, Type 2 Diabetes, and Latent Autoimmune Diabetes in Adults, Focusing on the Misdiagnosis and Treatment of LADA

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Research Poster

The American Diabetes Association (ADA) annually publishes the “Standards of Care in Diabetes” to provide clinical guidelines on diabetes classifications, diagnostic criteria, and treatment options. In their 2024 edition, the American Diabetes Association Professional Practice Committee recognized four categories of diabetes: (1) type 1 diabetes, (2) type 2 diabetes, (3) specific forms of diabetes due to other causes, diseases of the exocrine pancreas, and diabetes induced by drugs or chemicals, and (4) gestational diabetes. Notably absent from this classification is latent autoimmune diabetes in adults (LADA), despite the evidential differences in pathophysiology, diagnosis, treatment, and prognosis. Instead, the ADA lists LADA as a subset of type 1 diabetes while acknowledging the physiological differences between the two diseases. The exponentially increasing rates of misdiagnosis of LADA as type 1 or type 2 diabetes underscores the critical need for greater awareness and recognition, as inaccurate diagnosis can significantly worsen the autoimmune aspects and rate of progression of the disease. This paper explores the pathophysiological, endocrinological, and immunological features of type 1 diabetes, type 2 diabetes, and LADA, emphasizing the need for LADA to be recognized as a distinct classification with established guidelines for diagnosis and treatment.

R179 The impact of HEC1 tail contacts with microtubules on kinetochore-microtubule attachment stability

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Jennifer DeLuca

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Research Poster

The essential kinetochore (KT)-associated NDC80 complex mediates proper chromosome segregation during mitosis. Improper segregation of genetic material can contribute, if not corrected, to chromosome instability. A subunit of the NDC80 complex, the HEC1 protein, directly interacts with the cytoskeletal protein, tubulin, in the form of growing and shrinking dynamic microtubules. A key MT binding structure of the HEC1 protein is the HEC1 ‘tail’, which is a highly basic 80 amino acid unstructured region on the N-terminus of HEC1 and is proposed to interact with the highly acidic microtubule lattice. It is through this HEC1-MT interaction that chromosomes congress at the spindle equator in preparation for segregation to each daughter cell. This work specifically seeks to evaluate how predicted HEC1 tail contacts with the MT lattice, which contribute to chromosome alignment later in mitosis, affect KT-MT attachment stability early in mitosis. Previous work has shown KT-MT attachments are highly labile early in

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mitosis due to the activity of kinase regulators. However, it is unknown how these predicted HEC1 tail contacts affect attachment stability regulation early in mitosis when kinases/phosphatases are otherwise unaffected. I hypothesize that predicted contacts between the HEC1 tail and MT lattice do not contribute to attachment stability regulation in early mitosis. To test this hypothesis, I have generated plasmids to express modified Hec1 tail constructs in human cells which increase the predicted contacts between the HEC1 tail and MT lattice. Thus far, I have successfully expressed, stained, and imaged the modified HEC1 tail constructs in mammalian cells. Preliminary quantification has shown successful expression of both control and experimental HEC1 constructs in cells early in mitosis and confirmation of my ability to evaluate KT-MT attachments. My next step will be to achieve high enough N-values to confidently describe the role of HEC1 tail contacts with the MT lattice early in mitosis.

R207 De novo Genome Assembly of *Mycoplasma bovis*: A Contribution to Multilocus Sequence Typing

Katie Moore and Christie Mayo

Tyler Sherman

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Research Poster

Mycoplasma bovis (*M. bovis*) is a prominent bacterial pathogen associated with the development of Bovine Respiratory Disease (BRD); a disease complex that causes pneumonia, otitis media, arthritis, mastitis, and reproductive disorders, among others, in afflicted animals. Predominately recognized as an opportunistic pathogen in cattle, *M. bovis* clinical infection manifests following periods of herd stress and development of co-infections. Establishment of this pathogen within cattle herds poses a large economic threat to the agricultural operation as the pathogen is easily transmissible between individuals and results in decreased production or potential culling of the herd. At present, the *M. bovis* genome remains not fully characterized, creating a significant gap in knowledge about strain ecologies, pathogenicity, virulence factors, and potential genetic sources for treatment development. Using samples from clinical cattle (*Bos taurus*) and bison (*Bison bison*) specimens, this project aims to de novo assemble full *M. bovis* genomes using the long read capability of Nanopore sequencing technology. Once compiled, *M. bovis* genome isolates will be categorized based upon the multilocus sequence typing (MLST) scheme, a method that utilizes the allelic profiles of standardized genetic loci to determine the subtype of a bacterial strain. MLST provides a meaningful contribution to *M. bovis* metadata compilation efforts, allowing for the tracking of strain evolution, virulence development, and geographical genetic diversity. By enhancing metadata collection efforts we

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will increase surveillance of subtype populations, thus providing a reliable reference that is advantageous when mapping *M. bovis* spread to additional species, such as bison.

R180 Urinary Tract Infections by *Escherichia coli* infections Results in Neuroinflammation in an Aging Guinea Pig Model

Genova Mumford

Julie Moreno

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Research Poster

Urinary tract infections (UTIs) impact millions globally, with a greater prevalence seen in elderly populations¹, with 15-30% of all infections in individuals over 60 years old resulting from an infection of the urinary tract². In these elderly populations patients present atypically, causing confusion and delirium³. Our previous studies had shown that Hartley guinea pigs naturally presented with age-related neuroinflammation and are less likely to recall previously encountered objects and to explore exposed areas, supporting a worsening neurological state, however it was unknown if the UTI would exacerbate this phenotype. We hypothesize that a UTI will exacerbate neuroinflammation in aging Hartley guinea pigs, and treatment with antibiotics may mitigate long-term neurotoxic effects by alleviating inflammation. To address this, we used 3 groups, 1) uninfected, 2.) infected with *E. coli*, and 3.) infected with *E. coli* and with antibiotic treatment. Neurological tissues were stained to assess the neuroinflammation and misfolded proteins present, finding that UTIs result in increased neuroinflammation and misfolded proteins present. Antibiotic treatment decreased neuroinflammation, but it did not arrest the accumulation of misfolded proteins. Data collection is still ongoing, and current areas of focus include examining pathologies at different timepoints and examining the impacts of the antibiotic administered.

R197 Quantitative analysis of deer mouse placental structure during early pregnancy under environmental hypoxia

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Research Poster

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Evolutionary adaptations can play an important role in supporting successful reproduction and survival in novel and challenging environments. Lowland-ancestry populations experience fetal growth restriction at high elevations, while adapted populations exhibit normal fetal growth. However, the developmental origins of these differences remain unclear. The Wilsterman Lab at CSU uses a comparative model system (*Peromyscus maniculatus*), to understand the physiological and developmental adaptations that contribute to fetal growth protection. To understand how early developmental adaptations impact fetal growth, we subjected deer mice derived from Mt. Blue Sky, CO (4300 m ASL; highlanders) and Lincoln, NE (616 m ASL; lowlanders) to either normobaric normoxia or hypobaric hypoxia (equivalent to 4300 m) throughout pregnancy. We collected early pregnancy (day 13.5-14.5) implantation sites (intact fetus + placenta) from 4-8 unique dams within each experimental group. We collected 10 μ m cryosections from each implantation site at the approximate midline for immunohistochemistry. We labeled the placentas with antibodies against cytokeratin to mark trophoblast cell structures, laminin to outline the basal membrane, and DAPI to highlight nuclei. Together, these labels provide a comprehensive view of placental structure. We captured 17-21 images per experimental group and quantified the labyrinth zone and the fetal blood spaces within it using a custom protocol created for FIJI. We predict highlanders will have more developmentally mature placenta that can withstand adverse environments, thus protecting fetal size in highland adapted deer mice. Our findings will deepen our understanding of reproductive adaptations to hypoxia and advance our knowledge of placental physiology across mammals.

R170 Socioeconomic Factors, Chronic Stress, and Episodic Memory in Children

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Emily Merz

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Research Poster

Memory is crucial for children's cognitive development. Episodic memory is a measure of long-term personal memory. Socioeconomic status (SES) has been found to impact children's hippocampal development, the brain region highly involved in memory (Botdorf et al., 2022). Increased levels of cortisol, the stress hormone, have also been found to impact children's hippocampus (Keresztes et al., 2020). Children from lower SES families have increased acute cortisol levels that correlate with reduced memory functioning (Raffington et al., 2019). Little is known about how chronic levels of cortisol may impact episodic memory in children. This study examined how SES and chronic stress influence episodic memory in 5- to 13-year-olds (n=67). SES was assessed via parental income and education, and hair cortisol concentration (HCC) was

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measured using the 3 cm of hair closest to the scalp. Episodic memory was evaluated using the NIH Toolbox Picture Sequence Memory Task. Results indicated that age ($p < .001$) and SES (both family income [$p = .03$] and parental education [$p = .02$]) were positively associated with episodic memory. HCC was found to significantly moderate the development of episodic memory ($p = .02$) while controlling for sex, family income, and parental HCC. Memory improved with age for children with low ($p < .01$) and average ($p < .01$) HCC but not for those with high HCC ($p = .06$). These findings imply that children with increased levels of chronic stress exposure may not develop improved memory functioning like children with lower stress exposure. These findings allow us to better understand the influences of chronic stress and SES on childhood cognitive development

O19 Examining the Underrepresentation of P.E.E.R.s within Chemistry Culture

Seth Nuncio-cagle and Sophia Bond

Courtney Ngai

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Oral Presentation

P.E.E.Rs (People historically Excluded due to Ethnicity or Race) have been underrepresented in the field of chemistry for years. Based on a dataset produced by the National Center for Science and Engineering Statistics, as students progress into the higher education levels of chemistry, the more apparent it becomes that there is less diversity in the field. Within chemistry and any field of work, there is a culture comprised of underlying assumptions, values, and policies that defines the working environment. Understanding the culture of chemistry may explain the underrepresentation of P.E.E.Rs, making it necessary to investigate the existing culture, with the overarching goal to precipitate impactful and substantial change to make it more inclusive for P.E.E.Rs. Utilizing methods from grounded theory, six experiences of chemistry in the form of interviews were broken down into succinct summaries that eventually led to common themes across each interview. Major themes include that P.E.E.Rs felt the need to separate their identity from chemistry, they can't meet the expectations of a typical chemist due to the identities they hold, and people in power will either make or break their chemistry experience. In order to make chemistry a more inclusive field, there needs to be changes to the chemistry culture. Cultural changes such as inclusion and equity can be difficult to implement in systems that have been and still are successful in their traditional ways, but it's necessary to further the field of chemistry.

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R200 Development of a CRISPR-Cas system to investigate the impact of UGT8 and GALC knockout on dengue virus life cycle in human hepatoma cells

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Rushika Perera

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Research Poster

Dengue viruses (DENVs) belong to Flaviviridae and are transmitted to humans by the bite of an infected mosquito. They cause ~400 million infections per year. DENVs alter lipid metabolic processes in the host to remodel host cell membranes that encase viral replication complexes. Preliminary studies indicate that galactosylceramide (GalCer), a sphingolipid, modulates virus replication. Two enzymes critical in the synthesis and degradation of GalCer are UDP-galactosyltransferase 8 (UGT8) and galactosylceramidase (GALC). We hypothesize that knockout (KO) of UGT8 will result in a decrease in GalCer and an increase in membrane fluidity. We anticipate the resulting increase in fluidity will facilitate virus release. Conversely, GALC KO will result in an accumulation of GalCer, reducing membrane fluidity, therefore decreasing extracellular DENV titer. We aimed to study the effects of CRISPR-Cas mediated KO of UGT8 and GALC on DENV infection in-vitro. To create KO cell lines, pLV2 puro plasmids were digested with BsmBI, a restriction enzyme. We then ligated each gene with pLV2 puro. Transformed bacterial colonies were isolated and cultured for DNA extraction. Ligation accuracy was confirmed by sequencing. Lentivirus produced by transfecting human embryonic kidney cells with plasmid DNA were used to infect Huh-7 cells, creating unique KO cell lines. We infected these cell lines with DENVs and analyzed the impact of the KO on virus titer. Results of these analyses will be presented.

R190 Semaglutide Attenuates Macrophage-Induced Glial Inflammatory Response in an In Vitro Murine Model

Quinn Pogge

Katriana Popichak

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Research Poster

Semaglutide, also known as Ozempic, is a glucagon-like peptide 1 receptor agonists (GLP1-RA) increasingly prescribed to regulate blood glucose levels in Type II diabetics and body weight management. While Semaglutide is effective and generally safe, there are still uncertainties

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about its anti-inflammatory properties and the side-effects it can entail. Studies show that Semaglutide promotes macrophages to adopt an anti-inflammatory phenotype, resulting in reduced peripheral inflammation, suggesting that Semaglutide could address neurodegenerative disease-associated neuroinflammation, inflammatory response mediated by activation of the transcription factor Nuclear Factor-kappaB (NF- κ B) in glial cells within the brain. Thus, we hypothesize that Semaglutide treatment in an in vitro macrophage cell line reduces a model of peripheral inflammation and mitigates macrophage-mediated inflammatory responses in primary glial cells, underscoring its potential as a neuroprotective agent. To test our hypothesis, RAW cells are treated with lipopolysaccharide and varying concentrations of Semaglutide to assess changes in gene expression from inflammatory to anti-inflammatory states. Additionally, GLP1-R knockdown experiments conducted elucidate whether Semaglutide's anti-inflammatory effect is dependent on this receptor. Conditioned medium from RAW cells (RCM) applied to primary glial cells or Neuro-2a (N2A) neurons simulates peripheral inflammatory response on the brain, which will be measured for inflammatory and apoptotic responses. With Type II diabetes on the incline in America, celebrities and Western culture following trends of weight loss, Semaglutide use is not decreasing anytime soon. This makes it increasingly important to more completely understand the neurological effects of Semaglutide use that could potentially be affecting everyone taking Ozempic.

R206 Regulation of Metabolism by miR-137 in the Fat Body of Drosophila

Sophia Pruden and Rachel Geiger

Susan Tsunoda

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Research Poster

miR-137 is a small, regulatory microRNA that effects its targets by destabilizing mRNA at the step of translation. This serves to downregulate its target genes. Affected genes include many implicated in the development of neuropsychiatric conditions such as autism, schizophrenia, and bipolar disorder. The phosphatase PTP61F, an important negative regulator within the insulin pathway has recently been identified as a target of miR-137. Insulin signaling is essential in regulating energy homeostasis, specifically energy storage and availability. In *Drosophila*, null mutants of miR-137 exhibit metabolic disturbances including greater resistance to starvation and reduction of feeding behavior following starvation when compared to wildtype. Dysregulation of insulin signaling may also play a role in the development neuropsychiatric disorders as it serves as a neurotrophic factor, supporting neuronal proliferation and differentiation during development and synapse formation. In a CRISPR/Cas9 created global null mutant of miR-137, we use the UAS/Gal-4 system to express miR-137 only in target cell

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types within *Drosophila*. We focused on the Fat Body, which serves functions analogous to the mammalian liver and adipose tissue and has been shown to regulate energy homeostasis. We found that expression of miR-137 exclusively in the animal's Fat Body cells showed a partial rescue of starvation sensitivity and normal feeding behavior. We aim to further investigate the potential role that miR-137's regulation of PTP61F may play in the partial rescue of the wildtype response to starvation and feeding behavior in *Drosophila* when miR-137 is expressed exclusively in Fat Body cells.

R159 Mosquito bloodmeal identification and West Nile virus prevalence throughout Northern Colorado in Summer 2023

Catalina Puska and Claire Stewart

Brian Foy and Michelle Savran

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Research Poster

Since its introduction to Northern Colorado roughly 25 years ago, West Nile virus (WNV) has remained a concerning infectious disease. Summer 2023 had the most human WNV infections since the early 2000s, with many hospitalizations and 51 deaths. Mosquitoes are the primary vector of WNV, which they contract from avian reservoir species. We are studying oral vaccine and endectocide-based methods to reduce WNV prevalence in birds to prevent transmission to mosquitoes, and consequently to humans and livestock. Mosquito bloodmeal identification is important to these efforts as it can give us a more complete understanding of which vertebrate species mosquitoes are feeding on to gauge where WNV prevention methods should be targeted. In summer 2023, we collected *Culex pipiens* and *Culex tarsalis* mosquitoes from traps throughout Larimer and neighboring counties. We identified and speciated blood fed females, then separated abdomens for bloodmeal host DNA extraction. Heads and thoraces were retained for WNV testing. To determine the host from which the bloodmeal came, mosquito abdomens are homogenized, DNA is extracted, and the cytochrome oxidase I gene is amplified via PCR and sequenced. The heads and thoraces undergo homogenization, RNA extraction, and quantitative real-time PCR to detect WNV. We will compare the mosquito species to the host bloodmeal species and to WNV positivity rates to determine any possible patterns. While these data are still being explored, they could possibly reveal patterns in WNV transmission between vertebrates and mosquitoes that could direct our control efforts and help reduce WNV in humans and livestock.

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R191 Using *C.elegans* to assess the toxicity of occupationally relevant exposure to mixtures of agricultural dust and wildfire smoke

Rose Reiter and Jacob Smoot

Luke Montrose

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Research Poster

Hot and dry periods are becoming more commonplace for longer periods of time, increasing the prevalence of wildfires. Higher exposure to wildfire smoke (WFS) is important to consider alongside other air pollutants, particularly in occupational settings such as the agricultural industry. Current literature suggests that there is an important link between air pollution and the reproductive system needing deeper investigation. The *C. elegans* model is a high throughput, low-cost model that is used to assess air pollution toxicity. We used *C. elegans* to better understand potential health impacts of agricultural dust (ADE) and WFS mixtures. Lethality and behavioral assays using *C. elegans* will be used to demonstrate the toxicity of ADE, WFS, and a mixture. WFS from Douglas Fir needles was generated in a combustion chamber at smoldering temperatures and collected onto PTFE filters, then into a solution. ADE was prepared with HBSS and dust from Coloradan feed lots then filtered and measured for experiments. *C. elegans* were then age synchronized to L4, then transferred to NGM plates containing 100uM FuDR to halt egg hatching. *C. elegans* were treated with 10, 50, and 100 ug/mL of WFS, ADE, 1:1 mixture, or M9 buffer as a control. Lethality and behavioral assays were conducted after 24hrs then assessed every 24 hours. Behavioral data was collected and analyzed using videos imported to WormLab (MBF Biosciences) and was assessed for activity including speed and body bends. Research is ongoing but aims to provide insight to the brain & reproductive toxicity of WFS and ADE.

R198 In Vitro Efficacy testing of Anti-retroviral Drugs Dolutegravir and Maraviroc on SIVRCM, a Progenitor Virus of HIV-1

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Ramesh Akkina

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Research Poster

Viral zoonosis, the transmission of viruses from animals to humans, remains a significant global health concern following events such as the SARS-CoV-2 pandemic. Human immunodeficiency

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virus (HIV) originated from simian immunodeficiency viruses (SIVs) crossing species barriers, with HIV-1 evolving from chimpanzee and gorilla SIVs and HIV-2 from sooty mangabey SIVs. SIVRCM from red-capped mangabeys is a progenitor virus from which SIVcpz originated which in turn gave rise to the current HIV-1. SIVRCM has been shown to have the ability to infect human immune cells and represents another potentially zoonotic threat worth investigating. While HIV primarily uses CCR5 or CXCR4 co-receptors for cell entry, SIVRCM predominantly utilizes CCR2. This study investigated the efficacy of current HIV antiretroviral drugs dolutegravir (an HIV integrase inhibitor) and maraviroc (a CCR5 agonist), separately and in combination, against infection by SIVRCM in the human MOLT-4 T-cell line. By exposing infected cells to varying concentrations of these drugs, we assessed SIVRCM's replication capacity through quantitative PCR analysis of viral RNA in cell culture supernatants. This approach allowed us to determine the effectiveness of these drugs against SIVRCM and whether SIVRCM could adapt to use the CCR5 co-receptor in human cells, making maraviroc a potentially useful therapeutic in the event of zoonotic transmission. This research highlights the importance of continued surveillance and preparedness for potential emerging viral threats from non-human primate reservoirs.

C10 Digging Deeper: Agricultural Workers' Views on Soil Health and Well-being in Colorado

Ryan Sawyer

Morgan Valley

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Community Engagement Poster

The soil microbiome is incredibly important for producing agricultural products, yet little is known about its implications on human health. Previous studies have addressed soil health and the connection to human health, but from a much broader perspective and not focused explicitly on the experience of farmers who prioritize soil health. This study is focused on addressing the lived experiences of farmers, highlighting the connection between different agricultural soil health practices in relation to their health and wellbeing. The data has been collected via 1 hour interviews with agricultural supervisors and workers. There have been many themes during the interview process leading to significant findings. Such findings include that soil health practices have had a tremendous impact on mental and physical health. Some agricultural producers explain that their lifestyle of working in food production have had significant impacts -both positive and negative- on mental health. This study aims to gain more knowledge on worker health in relation to agricultural practices, to help inform future health and safety guidelines.

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R177 Auditioning candidate *Mycobacterium tuberculosis* homing peptides using a phage display genetics platform.

Josie Small, Ana Carolina, and Takatsu Fonseca

Gregory Robertson

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Research Poster

Phage display is widely used for identification of organ- or disease-specific homing peptides. Prior work from our group identified five candidate peptides with binding affinity for *Mycobacterium tuberculosis* (Mtb) following biopanning of a CX7C phage-displayed peptide library on Mtb grown in vitro. Four of five peptides show a near consensus RGK motif, while the fifth candidate (CIG) lacks this motif suggesting it might interact differently with Mtb. In the present work, we sought to further interrogate this possibility by performing phage display auditioning studies in which T7 phage expressing CIG - or control peptides - are “auditioned” for their ability to home to BSL2 auxotrophic Mtb MC2 6206 in culture. Our hypothesis being that CIG-expressing phage will exhibit higher binding affinity for Mtb compared to controls. After the auditioning step, the number of bound phage are quantified using a simple *Escherichia coli* plaque-formation assay followed by sequence analysis to verify phage identity. Together, this project offers a streamlined approach to efficiently identify candidate peptides with homing potential for Mtb, which could be repurposed as diagnostic tools or for targeted drug delivery approaches, if successful.

R171 Material Hardship and Error-Related Negativity (ERN) Amplitudes in Children

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Emily Merz

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Research Poster

Socioeconomic factors in a child’s environment have been found to impact their brain development. Material hardship refers to facing challenges such as food insecurity, housing instability, inadequate medical care, and difficulty paying for utilities (Lichtin et al., 2020). Event-related potentials (ERPs) are a form of electrical brain activity that occurs in response to specific events and stimuli (Sur & Sinha, 2009) and are derived from electroencephalography (EEG) recording. Error-related negativity (ERN) is an ERP that occurs when an individual makes a mistake on a task. A larger ERN amplitude suggests more efficient neural processing of error

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monitoring (Meyer et al., 2019) and has been associated with better executive functioning (Grammer et al., 2018). The goal of this project was to examine associations between material hardship and neural activity underlying error processing in 5- to 13-year-olds ($n = 76$). Material hardship is measured using a parent-report questionnaire that inquires if families experienced different forms of material hardship due to insufficient household income. While wearing the EEG cap, children complete computerized cognitive tasks, such as the speeded flanker task (Lin et al., 2020), that are designed to elicit the ERN response. Multiple linear regressions conducted in R (version 4.3.1) suggest that material hardship was significantly associated with reduced ERN amplitudes ($\beta = 2.38$, $p = 0.007$). Potential mediators and moderators are being investigated to further help explain this relationship. These results aid in helping us understand the neurobiological underpinnings of how childhood experiences impact cognitive development.

R204 Ketamine reverses chronic stress-induced mental disorders via the expression of Ca²⁺-permeable AMPA receptors in mice

Paige Vetter and Joshua Flowers

Seonil Kim

College of Veterinary Medicine and Biomedical Sciences

Research Poster

Chronic stress affects brain functions leading to the development of mental disorders like anxiety and depression, as well as cognitive decline and social dysfunction. Among many biological changes in chronically stressed brains, disruptions in AMPA Receptor (AMPA)-mediated synaptic transmission in the hippocampus are associated with stress responses. We have revealed that low-dose ketamine rapidly induces the expression of GluA1-containing, GluA2-lacking Ca²⁺-Permeable AMPARs (CP-AMPARs), which enhances glutamatergic synaptic strength in hippocampal neurons. Additionally, subanesthetic low-dose ketamine decreases anxiety- and depression-like behaviors in naïve animals. In addition to reducing depression, some research indicates that ketamine may have protective effects against chronic stress in both humans and animals. However, the role of CP-AMPARs in the actions of ketamine's antistress effects is largely unknown. Here, we use whole-cell patch-clamp recordings from CA1 pyramidal neurons in female and male hippocampal slices to affirm that subanesthetic low-dose ketamine treatment induces CP-AMPA expression in these cells. Using multiple behavioral assays including reciprocal social interaction, contextual fear conditioning, and tail suspension test, we demonstrate that low-dose ketamine treatment reverses chronic restraint stress (CRS)-induced social dysfunction, hippocampus-dependent fear memory loss, and depression-like behavior in both female and male mice. Furthermore, we show that the

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ketamine-induced antistress effects on these behaviors is dependent on CP-AMPA expression. From this, our findings suggest that subanesthetic low-dose ketamine rapidly triggers the expression of CP-AMPA in the hippocampus, which in turn enhancing synaptic strength to induce antidepressant and antistress effects.

R162 Effect of Attentional Deficits on Memory Binding: Implications for Alzheimer's Disease

Kenna Waldrop

Carol Seger

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Research Poster

Memory binding forms the basis of short-term and long-term learned associations of objects and context, forming unified representations of objects in our perceptions. Memory binding can be divided into two categories: relational and conjunctive. Relational binding is the association between multiple stimuli while maintaining their independence. Conjunctive binding is the unification of stimuli into one entity. Relational memory can be thought of as remembering that one has placed their key onto a desk, while conjunctive memory can be thought of as combining all of the features of a key (head, ridges, shaft) into one object (key). The differences between relational and conjunctive memory binding performance have been implicated as early cognitive markers for preclinical Alzheimer's Disease (AD), a disease known for its severe memory and attentional deficits, and have proved consistent against other dementias. This study aims to examine the impact of attentional deficits on conjunctive and relational short-term memory binding in healthy young adults and explores the implications they have for Alzheimer's Disease cognitive marking and diagnosis.

R181 OZ439-Induced Autophagy: A Novel Approach to Combat Drug-Resistant Mycobacterium abscessus

Elizabeth Williams

Juan Belardinelli, Mary Jackson, and William Wheat

College of Veterinary Medicine and Biomedical Sciences

Research Poster

Due to the rapidly growing amount of drug-resistant non-tuberculosis mycobacteria (NTM) which cause an increasing number of pulmonary infections particularly in immunocompromised

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patients, new methods of treatment must be developed for NTMs. Therefore, the objective of this experiment is to investigate the role of the ozonide OZ439 in stimulating autophagy in human macrophages. The hope is that OZ439 is inducing the autophagy process in macrophages, to help the immune system clear the infection without relying solely on unreliable antibiotics. To visualize autophagy in OZ439 treated macrophages, western immunoblotting is utilized to detect the production of LC3-II as a function of dosage with OZ439 and time after treatment. The expected result is that the treatment of macrophages with OZ439 will be at least partially responsible for the killing of intracellular Mycobacterium abscessus. If this is the case, it is the hope that this approach will minimize the selection of antibiotic-resistant strains which inevitably develop with treatment using suboptimal drugs.

R192 Hum-2 *Caenorhabditis elegans* Mutants: A Model for Studying Myosin V in Neural and Behavioral Contexts

Meadow Zacher

Leslie Stone-Roy

College of Veterinary Medicine and Biomedical Sciences

Research Poster

Caenorhabditis elegans is a model organism for researchers due to its transparency, rapid life cycle, small size, and ease of genetic manipulation. This species shares 38% similarity in protein-encoding genes and 40% disease associated genes with humans. This genetic similarity allows researchers to study the effects of different mutations on *C. elegans* to draw conclusions and connections to human health and disease. Myosin V proteins are a class of unconventional myosins that are highly conserved among organisms. They are primarily expressed in the brain and PNS in humans and are involved in key processes necessary for proper neuronal signaling. Deficiencies in these proteins are linked to Griscelli Syndrome Type 1 (GS1), a disease with a current lack of treatment options. The hum-2 gene in *C. elegans* is an orthologue of the human MYO5A gene. The objective of this research was to study the effect of hum-2 mutations in *C. elegans* to elucidate possible similarities in humans with MYO5A mutations. Knockout hum-2 mutants were studied through a series of behavioral assays in comparison with N2 wild type animals to assess differences in neuronal health and behavior between the two. Sensory and motor differences between genotypes were minimal, however, the mutants exhibited defects in chemosensation and associative learning. The suspected reason for these impairments relates to myosin Vs role in mRNA localization and neuronal polarity. This research has potential to clarify effects of MYO5A mutations in humans and aid in creating better treatment options for those impacted by GS1.

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C11 Harboring Diversity in STEM/Pre-Health Fields

Mursal Zeerak

Samrawit Desta

College of Veterinary Medicine and Biomedical Sciences

Community Engagement

The underrepresentation of P.O.C in healthcare-related fields remains a significant barrier to equitable medical care and professional diversity. My project aims to address this disparity by increasing awareness of the various career pathways available in health and medicine, particularly for students of color. Beyond traditional clinical roles, opportunities in finance, human resources, research, and administration contribute to shaping healthcare systems and ensuring diverse perspectives are represented. Nationally, 9% of STEM workers in the U.S identify as Black, and 7% identify as Hispanic, however nationally the population is split 58.4% White and 41.6% P.O.C. This shows the drastic disparity in the number of P.O.C in the US vs their representation in STEM fields. At CSU alone, the student body is made up of 29.7% P.O.C with the rest being our White peers. Historical biases, such as the misconception that Black patients experience pain differently, highlight the urgent need for diverse voices in medical education and practice. To support this goal, I am collaborating with another student of color to establish a student-led organization that provides guidance, mentorship, and resources for pre-med and health-focused students of color. This initiative will help students navigate their academic and professional journeys while fostering a community that advocates for representation in the health industry. By expanding access to knowledge and support networks, my project seeks to empower students of color to pursue careers in healthcare, ultimately contributing to a more inclusive and equitable medical field.

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R227 Decoding Fractional Killing: The Role of Substrate Stiffness and Cell Cycle on Cancer Cell Death

Natalie Calahan, Ashok Prasad & Scott Burlingham

Soham Ghosh

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Research Poster

In cancer treatment, a major challenge lies in fractional killing, where a fraction of cells survive therapeutic intervention. This phenomenon is often linked to heterogeneous cellular mechanisms that enhance cancer cell resilience and evasion of apoptosis. Tumors exhibit stiffness gradients, with spots of extremely stiff regions and relatively soft regions, creating treatment challenges as cell behavior and response to therapy can be attributed to microenvironment mechanics. The objective of this study is to find if substrate stiffness defines doxorubicin (DOX) inducible cell death and what mechanism governs this change. We found that stiffer substrates result in faster and greater activation of Caspase-3 in HeLa cells treated with DOX. Cells on stiff substrates showed a more robust F-actin structure, prompting us to explore if the actomyosin complex affects DOX uptake by altering nuclear pore size. DOX accumulation was greater in cells on stiff substrates, suggesting increased entry. However, inhibiting actin structure formation and actomyosin contraction on stiff substrates did not reduce DOX uptake. Interestingly, synchronizing cells to the G1/S phase boundary before DOX application showed similar Caspase-3 activation on both soft and stiff substrates. These findings suggest that substrate stiffness influences apoptosis activation, and while the actomyosin complex is not the governing factor, the stiffness-driven cell cycle plays a key role in modulating this variability.

R224 Shedding Kinetics for Murine versus Simian Rotavirus in a Mouse Model

MacKenzie Demmel, Allison Vilander & McKenzie Fletcher

Gregg Dean

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Research Poster

Rotavirus is a pathogen that disproportionately affects lower- and middle-income countries, killing over 200,000 children every year. Existing rotavirus vaccines used in people are

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attenuated-live, meaning they are a replicating version of the pathogen that does not cause disease. We are developing a subunit vaccine that exploits a probiotic bacteria platform. In order to compare our novel vaccines to the current gold-standard live-attenuated approach, we sought to test two candidate live-attenuated rotaviruses in an adult mouse model. This study analyzed virus shedding kinetics in the intestine and immune responses of adult mice after inoculation with a cell-culture adapted murine virus strain (ETD) versus a rhesus rotavirus strain (RRV). Enzyme-linked immunosorbent assays (ELISA) were used to detect viral antigen and anti-rotavirus antibodies in feces. The duration of shedding, day of peak shedding, and level of shedding was recorded to characterize the virus strains. RRV had more shedding in the first three days post inoculation, whereas ETD continued to shed through day six. Additionally, the level of viral antigen in the fecal sample increased as RRV dose increased while ETD did not show a strong correlation between dose and antigen level. Positive days were calculated as days where the antigen level was two standard deviations higher than the mean of the inoculation day, and RRV also had more positive days than ETD at every dose other than the lowest. Since RRV displayed more consistent shedding kinetics and had more positive days, it can be used as the gold-standard live-attenuated comparison.

R216 Improving the Synthesis of Menaquinone Derivatives Utilizing Leaving Group-properties

Mark Kappus

Andrew Schlink, Debbie Crans, & Skyler Markham

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Research Poster

Menaquinone (MK), also known as vitamin K2, is commonly found in bacterial membranes. In this study, we focus on improving the synthesis of MK derivatives by changing the leaving group during the isoprenyl reaction. MK serves as the quinone that shuttles electrons between membrane-bound proteins during the production of energy in the electron transport chain (ETC) of certain procaryotes. The quinone head group on MK facilitates single electron reduction chemistry that occurs during the shuttling of electrons essential for this process, while its isoprenyl side chain varies in length and degree of saturation across different organisms. The current synthesis results in low yield (~20%), and we hypothesize that the choice of leaving group significantly impacts the amount of side product formation and thus, appropriate choice of leaving group will increase the yield. The differences in reactions with chlorine, bromine, mesylate, and tosylate as leaving groups were all considered due to their differing electronic properties and ability to enhance the desired reaction efficiency. To assess

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the impact of different leaving groups, the percent yields of products were determined using nuclear magnetic resonance (NMR) and will be discussed at the poster.

R223 Impact of Sugar Transport on the Stress Tolerance of Cyanobacteria

Sami Kupfner

Darcy Hunstiger

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Research Poster

Algae are a promising carbon-neutral alternative to fossil fuels that convert sunlight into useful products like fuels, pharmaceuticals and more. However, the production of industrial algae requires large amounts of water and energy, leading to high harvesting costs and water sustainability concerns. One way to improve both economics and water sustainability is growing the algae in sticky cell clumps called biofilms. Cyanobacterium, a type of algae, is readily genetically manipulated to make renewable products, but industrial strains do not readily form biofilms or tolerate the stress of a reduced water growth system. This project aims to better understand biofilm formation and its relation to stress tolerance within a model industrial cyanobacterium *Synechocystis* PCC 6803 (*S. 6803*). A recent study knocked out a certain gene in *S. 6803* that caused increased cell-cell clumping – a hallmark of biofilms. The Peebles lab is taking this further by assessing whether this clumping is linked to increased stress tolerance. In addition to studying this knockout gene we also overexpressed a sugar transport gene identified to be important for clumping. This decreased the clumping behavior but increased cyanobacteria survivability under drought stress. This presentation focuses on designing, transforming, and monitoring a sugar transporter overexpression-only plasmid as well as a sugar transporter knock out only plasmid to better understand this unexpected behavior. Better understanding the relationship between stress tolerance and biofilms in industrially relevant cyanobacteria will expand the potential for novel growth methods towards a more sustainable future through carbon neutral algal products

R221 Optimization of trans-Cinnamic Acid Production in Cyanobacteria sp. PCC 6803

Marion Moore

Christie Peebles

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Research Poster

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Trans-Cinnamic Acid (tCA) is an important chemical in the pharmaceutical, food, and energy industries, with applications ranging from biofuel to anti-cancer drugs. Cyanobacteria, a photosynthetic species with similarities to algae, have shown promise as biofactories for tCA and other products of the Shikimate pathway, and can produce tCA in limited quantities after addition of the phenylalanine ammonia-lyase (PAL) gene into their plasmids. It is hypothesized that the overexpression of *aroH*, a gene at the branch point towards tCA, could be used to enhance tCA production in cyanobacteria with the help of a rhamnose-inducible promoter. Assembly of the target plasmid has proven difficult after multiple attempts at Hi-Fi assembly and restriction enzyme cloning, introducing the potential for toxicity of *aroH* to the cell. Troubleshooting methods currently include optimization of ligation and transformation processes, and supplementation of growth media with tryptophan. Once the plasmid has been assembled, genetically engineered colonies will be assessed for tCA production using high-performance liquid chromatography.

R215 Optimization of Graded CdSe/CdSe_xTe_{1-x} (x = 40)//CdTe Devices with CdCl₂

Treatments

Tillie Pinkowitz

Amit Munshi

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Research Poster

Cadmium telluride (CdTe) solar cells are a leading technology in renewable energy due to their low cost and high efficiency. This project focuses on improving their performance by incorporating cadmium selenide (CdSe) to create a graded CdSeTe (CST) layer. This enhances how the solar cell absorbs sunlight and converts it into electricity. A critical step in the fabrication process is treating the material with cadmium chloride (CdCl₂), which improves efficiency by passivating the electronic and structural defects at a microscopic level. At CSU, this treatment is done using a vacuum-based technique called close space sublimation (CSS). However, fine-tuning the CdCl₂ process is necessary to prevent unwanted side effects and ensure consistency. The goal of this project is to optimize both the material composition and processing steps to develop more efficient and reliable CdTe solar cell, contributing to advancements in sustainable energy technology.

R222 Engineering an Auxin Biosensor in *Aspergillus Niger* Fungi

Bella Plath

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Dylan Moss

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Research Poster

Genetic biosensors provide a way for a cell to autonomously detect and provide a measurable response to a specific chemical or biological signal. In the presence of auxin, the biosensor that is being constructed will signal for the degradation of a protein, venus, by means of ubiquitination. The transformed DNA will contain two fluorescence proteins, venus (yellow) and mscarlet (purple). Therefore, when auxin is introduced in the system, the venus protein would be degraded and only purple fluorescence would be displayed. The dual fluorescence system will enable real-time monitoring of auxin presence and regulation within *A. niger*. The transformation process will involve protoplast-based integration of the biosensor construct into the *A. niger* genome. Successful transformants will be screened using fluorescence microscopy. This system will provide a novel tool for studying auxin signaling in filamentous fungi, with potential applications in plant-fungal interaction research, biosensing, and metabolic engineering. This experiment is part of a larger synthetic lichen project where cyanobacteria have been genetically engineered to produce auxin. The auxin biosensor would provide a method to demonstrate the responsiveness of the fungi to auxin. If successful, auxin could be used to target specific gene, cause morphological changes in the fungus when exposed to cyanobacteria. Cyanobacteria feeds fungus and releases auxin.

R218 Using cell morphology of cancer cells to predict drug-induced apoptosis.

Renzo Spagnuolo, Natalie Calahan, Soham Ghosh, Soumik Ghosh

Ashok Prasad

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Research Poster

HeLa cells were exposed to chemotherapeutic treatment over six time points spaced one hour apart. Actin and nuclear staining were utilized to identify and track cells, while caspase immunofluorescence served as an apoptotic indicator. The experimental design incorporated both soft and stiff substrate conditions, enabling interrogation of biomechanical influences on drug-induced cytotoxicity. Using CellProfiler, individual cells were segmented and tracked across each time point to extract morphological metrics. These features were then integrated with caspase signals to determine correlations between shape parameters and cell death. A machine learning algorithm was then used to identify morphological predictors of cell viability and apoptotic progression. Preliminary results suggest cell shape and its corresponding cytoskeletal organization impacts the kinetics of chemotherapeutic response. The experiment and imaging was conducted by Natalie Calahan, while I did the cellprofiler and machine learning

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work. Future work includes cell cycle experiments, refining machine learning models, and incorporating additional fluorescent markers for enhanced characterization of apoptotic cells.

R219 Cellular Contractile Forces Perturb Chromatin Density

Skylar Stephan

Ashok Prasad & Rosaline Danzman

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Research Poster

The cytoskeleton exerts forces on the nuclei and can affect its shape. This effect was shown to also affect the condensed chromatin depending on how the forces were changed. Using MATLAB's Sobel edge detection the amount of edges and the area can be quantified. These two measures can then be used to find the condensed chromatin density for the nuclei. Having this code run through all the images in the four different treatment groups reveals the significant differences between each group.

R225 Optimizing Observations of Mitochondrial Function with Fluorescence Imaging

Mia White, Quinn Taucher

Jesse Wilson

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Research Poster

Fluorescence imaging is widely used to understand mitochondrial health and function to study cancer, mitochondrial diseases, and more. NAD(P)H and FAD autofluorescence imaging is commonly used for measuring redox at the input of the electron transport chain, and Rhodamine 123 fluorescence is often used for measuring the voltage of the inner mitochondrial membrane at the output of the electron transport chain. Digitonin (a mild detergent) is widely used in mitochondrial research to permeabilize the cell membrane to allow chemical manipulation of mitochondria. In live cell imaging, concentrations need to be high enough to allow mitochondrial substrates (such as pyruvate, malate, and succinate) to pass through, yet low enough to avoid damaging or killing the cells. Therefore, we are imaging autofluorescence and Rhodamine fluorescence in cells exposed to substrates and varying concentrations of digitonin to find the right balance. Further, we are exploring new methods of combining NAD(P)H, FAD, and/or Rhodamine fluorescence for potentially more sensitive measurements than the conventional method of imaging NAD(P)H/FAD and Rhodamine separately.

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R226 Healing Through Tradition : Investigating the Antimicrobial Effects of Ghanaian Medicinal Plants

Alvina Yeboah

Jenniffer Riley

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Research Poster

Traditional medicine is a cornerstone of healthcare in Ghana, plant-based medicine is often the first option that many people choose when considering health care. This study investigates the antimicrobial effects of five traditional Ghanaian medicinal plants prekese (*Tetrapleura tetraptera*), hwentia (*Xylopia aethiopica*), neem (*Azadirachta indica*), bitter leaf (*Vernonia amygdalina*), and alligator pepper (*Aframomum melegueta*) against *E.coli*. Ethanolic extracts were prepared and infused into agar to assess their ability to inhibit bacterial growth. Bacterial growth was quantified by analyzing colony density and opacity. Preliminary results indicate that certain plant extracts exhibit varying levels of antimicrobial activity, with other treatments leading to visibly reduced bacterial activity. Statistical analysis including descriptive statistics were completed to analyze the trends in the data. These findings highlight the importance and potential of plant-based antimicrobials. Future studies should consider testing additional bacterial strains , refining extraction methods and varying the concentrations of extracts. This research underscores the importance of bridging traditional knowledge with analysis to explore sustainable healthcare solutions for different communities.

R220 Electro-Enhanced Anaerobic Digestion to Increase Production of Volatile Fatty Acids

Polina Zaytseva

Danielle Bartholet & Kenneth Reardon

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Research Poster

Anaerobic digestion (AD) is a process where organic materials are broken down into carbon dioxide and methane. However, these gases are economically unviable as fuels. In contrast, volatile fatty acids (VFAs), intermediates in AD, show much more promise as they are precursors to sustainable aviation fuels. Since longer-chain VFAs are more desirable, shifting acid profiles towards these longer-chain VFAs is also of interest. In pure cultures, electro-fermentation has been explored as a strategy to shift product profiles toward more reduced

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products by overcoming intracellular redox limitations. Applying this concept to mixed culture processes similarly influences processes on cellular and community levels by affecting microbial community structure. Electro-enhanced AD has shown that applied potentials can induce changes in microbial community composition, redox behavior, and product profiles.

Methodological challenges exist in differentiating the effects of direct electron transfer (DET) from background electrochemistry. Recognizing these challenges led us to investigate common pitfalls that lead to misinterpretations. For instance, the use of certain electrode materials can lead to anaerobic corrosion, which potentially influences metabolic processes through the release of iron and hydrogen evolution. Overall, electro-AD affects microbial community structure and product profiles. Electro-enhanced experiments were performed at applied potentials between -300 and -750 mV vs. Ag/AgCl. Metabolic, electrochemical, and taxonomic analyses studied the effects of DET and redox control on AD. Results indicated maximal total VFA productions at an applied potential of -600 mV vs. Ag/AgCl and a significant difference in microbial community structures between the control and biased reactors.

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R256 Public Perceptions of Bat Research: A Social Media Analysis Before and After the COVID-19 Pandemic

Yazeed Aljohani, Juliette Dashe, Nicole Kelp, and Trevor Hale

Shelby Cagle and Stacy Lynn

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Research Poster

Bats play a vital role in ecosystems, yet public perception of bat research is often shaped by concerns about zoonotic diseases. Following the COVID-19 pandemic, Colorado State University (CSU) initiated a bat research facility at its Foothills campus, facing mixed reactions from the local community. This study examines post-COVID social media narratives about CSU's bat research, comparing them to discourse surrounding similar research facilities in Montana, Kansas, and Texas. Using qualitative content analysis, we analyzed social media posts from platforms such as Facebook and X to identify key themes and sentiments. Preliminary results indicate that while some posts emphasize the ecological importance of bats, others highlight concerns related to biosafety, zoonotic disease risks, and institutional transparency. Notably, discussions around disease transmission, research safety protocols, and the role of universities in pandemic-related studies remain prominent. These findings highlight the ongoing challenges in science communication and the need for targeted outreach strategies. By addressing public concerns and fostering dialogue, CSU can improve community engagement and support for bat conservation and research initiatives.

R277 Spatial and Temporal Patterns in Snowpack Density over 1-km² Areas to Inform Sampling for Mountain Sites in Colorado

Carson Bainbridge and Steven Fassnacht

Warner College of Natural Resources

Research Poster

Snowpack properties vary over both space and time and can be important to understand when dealing with water resource management, understanding and modeling climate, estimating ecological health, and managing winter recreation. The data was downloaded from the National Snow and Ice Data Center (NSIDC) to understand the properties of snowpack in Rabbit Ears/ Buffalo Pass Colorado. Data collection took place during NASA's Cold Land Processes Experiment in 2002 and 2003 in late February and late March. Ground-based sampling measured density, depth, temperature, and stratigraphy. The Rabbit Ears Pass dataset was

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analyzed spatially and temporally to determine trends within and amongst different terrains and elevations. Density and depth were analyzed to determine variability amongst 16 randomized sites within the area. Results found little variation within the RBSP data for observation periods one and two. Bulk density and snow water equivalent analysis for each IOP showed results, but they are explained by the increase in snowfall from late February to late March. This information will inform future research on sampling snowpack in high-alpine areas such as Colorado.

C16 How Overfishing Impacts Puffins and Local Communities

Kimberly Bauer

Veronica Yovovich

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Community Engagement Poster

Overfishing poses a significant threat to Atlantic puffin (*Fratercula arctica*) populations and the livelihoods of coastal communities that rely on marine resources. This study examines the ecological consequences of overfishing on puffins, particularly the depletion of key prey species such as sand eels and herring, which are essential for chick survival and overall population stability. Additionally, the research explores the socio-economic ramifications for local fishing-dependent communities, balancing conservation efforts with economic sustainability. By analyzing the intersection of environmental degradation and human livelihoods, this project highlights the need for sustainable fisheries management, marine protected areas, and policy interventions that support both biodiversity conservation and economic resilience. Through stakeholder analysis and case studies from Iceland and other North Atlantic regions, this study advocates for collaborative solutions to mitigate overfishing's impact on both puffins and local communities.

R231 Changes in hydro-climate variables for the Loch Vale Watershed

Bradley Beck

Carolina Barbosa & Jill Baron

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Research Poster

The Loch Vale Watershed (LVWS) is a high elevation watershed located in Rocky Mountain National Park, Colorado. Past studies on high elevation watersheds, such as the LVWS, have

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shown that these ecosystems are particularly vulnerable to the effects of climate change. The goal of this project is to analyze and discuss historical seasonal trends in hydro-climate data and their impact on nutrient concentrations in the LVWS. The historical data being analyzed was collected by the LVWS Long-term Ecological Research & Monitoring Program, starting in 1982. The historical data analyzed in this project ranges from 1991 to 2020. We will compare historical with future trends modeled using the Hydrologic and Water Quality System (HAWQS) version 2.0. Significant historical trends of increasing daily mean temperatures and decreasing nitrate deposition were only found in winter seasons. Three global climate scenarios (GCM's) were used to model the LVWS under RCP 4.5 and RCP 8.5 scenarios. Future trends were modeled from 2020 to 2050. Future outputs modeled by HAWQS show increasing annual trends in precipitation and nitrate deposition. Further analysis shows that precipitation and nitrate deposition trends are correlated.

R251 Climate Clock: Exploring the Timing of Aspen Tree Senescence in Northern Colorado

Louisa Beckett and Mason Whitney

Sarah Hart

Warner College of Natural Resources

Research Poster

Climate change is altering the timing of key biological events like tree senescence, which disrupts ecosystems. While much is known about phenology, few studies examine how these patterns vary across different locations, particularly in quaking aspen trees (*Populus tremuloides*). This research compares aspen phenology in Longmont and Fort Collins, Colorado, to understand how localized climate factors influence tree behavior. Data were collected through weekly phenological observations at 20 sites using the BudBurst app to track leaf color change and drop, along with historical weather data including temperature, precipitation, and frost dates. Data analysis revealed that Fort Collins experienced earlier leaf senescence than Longmont, with significant differences in the timing of 50% leaf drop, but no differences in leaf color change or complete leaf drop. While precipitation remained quite similar, temperature and frost dates differed slightly more between the cities, with Fort Collins having cooler temperatures and earlier frost dates. This study highlights the influence of regional climate differences on tree phenology and emphasizes the importance of considering local climate factors in conservation strategies, particularly with climate change becoming a more prominent threat. Further research is needed to explore how these patterns may evolve in other areas.

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R275 PIT Tag retention rates in Creek chub (*Semotilus atromaculatus*) using differing placement locations and methods

Moira Benish-Kingsbury, Evan Bolstad, Kacie Vazquez del Mercado, Matthew Straw, Ralph Eberhard, and Ryan Edgar

Yoichiro Kanno

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Research Poster

PIT tags are commonly used in the field of fisheries science to track movement patterns in fish and identify individuals in a study. Identifying the most effective tagging methods and placements will enhance study efficiency and optimize resource allocation. Additionally, the ability to use a slightly larger PIT tag (12mm vs 8mm) allows for a greater detection range by antennae in field studies. The conservation efforts of small-bodied plains fish are increasing; therefore, the value of effective research methodology is relevant to these choices. We compared the retention rate of PIT tags in *Semotilus atromaculatus* between three trial groups using differing placement locations and methods: abdominally located with scalpel incision, abdominally located with syringe injection, and dorsally located with syringe injection. All entry wounds were treated with a cyanoacrylate adhesive to improve retention and healing rates. 180 fish between the sizes of 90-150 mm (mean length of 120mm) were collected via electrofishing from Spring Creek in Fort Collins, Colorado, and injected with 12mm HDX PIT tags. The fish were then held in trial groups of $n = 60$ and monitored in a laboratory mesocosm for monitoring over five weeks. We found that the abdominal incision trial group had the highest retention rate, while the dorsally injected trial group had the lowest. The abdominal injection trial group had lower retention than the abdominal incision group, but it did not differ significantly. Small creek chub had higher expulsion rates in the dorsal injection trial group than

O23 Getting Our Bearings: Predictors of bear presence in the Upper Ruby and West Fork watersheds

Emma Burdick, Aidan Hallsworth, Hannah Bailey, and James Wiske

Cassandre Venumiere-Lefebvre, Matthew Hyde, and Stewart Breck

Warner College of Natural Resources

Oral Presentation

Understanding the factors that influence carnivore presence in areas shared with livestock can provide critical insights to assist with anticipating encounters, preventing depredation, and fostering coexistence. This study employed a single-species occupancy model to determine

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which combinations of biological, ecological, and anthropogenic factors best predict black bear presence or absence and grizzly bear presence or absence in the Upper Ruby and West Fork watersheds of southwest Montana. After prioritizing research topics with local livestock producers, we investigated the influence that forest integrity, distance to water source, distance to development, elevation, and slope have on grizzly and black bear distribution in areas grazed by free-range cattle and sheep. Increased understanding of such covariates is necessary for developing more reliable estimations and predictions of grizzly and black bear distribution in this specific area of Montana. The findings have potential to inform livestock producers about areas with a higher risk of depredation, guide the selection of non-lethal deterrent methods, and identify the most influential factors predicting carnivore presence. This collaborative effort provided actionable data to enhance wildlife management and support sustainable ranching practices.

R244 Mapping Social Networks, Livestock Depredation, and Carnivore Tolerance in Tanzania

Mary Callaghan and Rekha Warriar

Jonathan Salerno

Warner College of Natural Resources

Research Poster

Many agropastoralist communities in Tanzania, East Africa, confront the daily realities of living alongside large carnivores such as African lions, leopards, and spotted hyena. These realities include risk of predation on livestock and also attacks on humans. As a result, human tolerance for living with carnivores is often low, and carnivores are persecuted in many ways, which poses critical challenges for biodiversity conservation. Though tolerance is critical if people are to coexist with wildlife, significant gaps remain regarding the scientific understanding of human tolerance for wildlife, as well as how tolerance is shaped and changes over time. The purpose of this research is to use a novel dataset describing social networks among agropastoralists gathered via mobile phone data, and to represent those data alongside survey data describing people's experience with and tolerance for interactions with carnivores. Exploratory results show visualizations of social networks and descriptive summaries of tolerance and predation data. Future research will assess causal relationships whereby predation experiences, including those of kin households connected through social networks, influence tolerance for carnivores. Current and future results can inform conservation partners and their strategies to target coexistence interventions within connected communities.

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R264 Wildlife Trafficking: Human-Wildlife Conflicts in the Illegal Exotic Pet Trade

Elena Canton

Veronica Yovovich

Warner College of Natural Resources

Research Poster

The exotic animal trade has run rampant across the globe, with the United States being one of the leading perpetrators of illegal wildlife importation. Thousands of different species are imported to the U.S. every year as pets, and the lucrative industry that wildlife traffickers have built brings in billions of dollars every year. This issue not only introduces potentially dangerous species to novel environments, but increases risks of human-wildlife conflicts such as invasive species release and zoonotic disease transfer. Animals are not the only affected party however, as the need for policies to regulate the pet trade around the world as well as the lack of concern for animal welfare also cause conflict between human groups such as exotic pet owners and suppliers, and animal welfare groups. With this project I will create a management plan that mitigates the harm that the illegal wildlife trade brings to both humans and animals by finding a common ground between stakeholder groups. I will also suggest methods to regulate the number of animals seized from their native habitats, as well as improve the unethical treatment towards exotic animals in the pet trade.

R241 High resolution optical remote sensing of tree damage in South Africa

Miranda Chin and Gloria Tait

Jody Vogeler and Steven Filippelli

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Research Poster

Elephants act as ecosystem engineers that can cause large impacts on their surroundings through browsing and toppling woody vegetation. In Thornybush Reserve, South Africa, elephant populations recently increased, causing a subsequent rise in these behaviors. However, methods to track and identify elephant-caused tree damage are still under-developed. This leads into the question of if it is possible to use remote sensing imagery and spectral indices to detect tree damage status. Methods consisted of tree digitizing from high resolution satellite imagery, in addition to ground data collected in 2023-2024 detailing tree location and damage. For analysis, 4-meter PlanetScope and 10-meter Sentinel imagery were compared to determine if there were trends in surface reflectance corresponding to tree

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damage. Results show that there is a small correlation of spectral bands and indices, specifically near-infrared, with tree damage status, but an ANOVA did not indicate significant differences in spectral values between tree damage classes. Implications include that more research is needed to determine how and when remote sensing imagery can identify tree damage. Some recommendations include more detailed classification for damage status, improved geospatial registration, and research into how remote sensing timing affects damage detectability.

R237 Do exotic ruderal species influence recovery from drought? Recreating the Dust Bowl in a world without *Salsola*

Mia Colangelo and Grayce Wojniak
Emmett Tooley
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Research Poster

Climate change is expected to increase the frequency of extreme droughts in grasslands. Such events can have catastrophic consequences for plant community structure and ecosystem functioning. For instance, the 1930's Dust Bowl in the U.S. Great Plains caused widespread plant mortality, with some grassland plant communities taking two decades to fully recover. Following the Dust Bowl drought, *Salsola* (a genus of invasive ruderal forbs) proliferated throughout the shortgrass steppe, but the impact of these ruderals on post-drought recovery remains unclear. Here, we investigated the removal of *Salsola tragus* on the recovery of the Colorado Shortgrass Steppe following an extreme 5-year drought that we experimentally imposed. Similar to the Dust Bowl, this drought led to mortality of the dominant C4 grasses and a shift to weedy ruderal forbs, primarily *Salsola tragus*. Post drought, aboveground net primary productivity (ANPP) in plots dominated by *S. tragus* was 3-4 higher than non-droughted prairie. But our results suggest that *S. tragus* removal did not affect the recovery of dominant C4 grass (cover or productivity). Indeed, recovery of both variables was minimal independent of *Salsola* removal. Similarly, *S. tragus* removal did not influence the recovery of subdominant C3 grasses, but the productivity of other forb species was marginally increased when *S. tragus* was removed. Overall, *S. tragus* removal led to decreased ecosystem carbon uptake (estimated from total ANPP) compared to plots dominated by this exotic ruderal. Our results show that the removal of *S. tragus* post-drought did not influence the recovery of dominant species and led to reduced ecosystem carbon uptake. However, recovery of plant community structure was minimal in both treatments, suggesting that additional years of monitoring will be necessary to determine whether biotic or abiotic factors are limiting post-drought recovery.

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C4 Mitigating Canada Goose Conflicts

Lauren Craig

Veronica Yovovich

Warner College of Natural Resources

Community Engagement Poster

Canada Geese in Fort Collins are ubiquitous and are often seen year round, both in urban as well as rural areas. Often considered a nuisance, their presence is inevitable and therefore associated with human conflicts such as automobile collisions, an inconvenient abundance of fecal matter, traffic obstruction, as well as other conflicts. Being a federally protected species hinders a direct public assertion of lethal management, and therefore public education about Canada Goose behavior as well as a human involved goose management plan, especially in urban areas, is essential to mitigate the occurrences of such conflicts.

R254 Identifying areas of high connectivity for the Greater Sage-Grouse in a warmer world

Sarah Culhane and Julie Heinrichs

Sergio Nicasio

Warner College of Natural Resources

Research Poster

The Sagebrush Steppe provides essential habitat and other ecosystem services for the Greater Sage-Grouse (*Centrocercus urophasianus*) and other species, but landscape fragmentation in recent years and loss of intact sagebrush cover has caused a significant decline in the Greater Sage-Grouse population. This study assesses the capability of Qgis and graphab analysis to accurately demonstrate the current and future state of landscape connectivity within an identified transboundary ecological corridor between Grasslands National Park in Saskatchewan, Canada, and the Glaciated Sage-Steppe region of Montana, a crucial migration pathway for the Greater Sage-Grouse and other sagebrush obligate species in the Sagebrush Steppe. When put through climate warming scenarios of 4.5 degrees Celsius and 8.5 degrees Celsius, shifts in landscape connectivity are expected, with some areas losing connectivity and other areas gaining connectivity, fragmenting the landscape and impacting the ability of the Greater Sage-Grouse to move unimpeded in between habitat patches. The results of this study can potentially be used to aid in current conservation planning supporting the current and future population of the Greater Sage-Grouse in the Sagebrush Steppe.

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R245 Dating Yellowstone Lava Flows using U-Th Geochronology

Roy Davis and Phillip Kondracki

Lauren Harrison

Warner College of Natural Resources

Research Poster

In the 1960's, 13 research wells were drilled in Yellowstone National Park. Stratigraphy was published decades before geologic maps were published and geochronological constraints established. New data has called into question the original stratigraphy and raised the possibility that there are subsurface rhyolite flows with no surficial outcrops. This project aimed to further refine the known dates of rhyolite flows in the Y-2 and Y-3 drill cores using U-Th dating techniques on zircon to interpret eruption ages of the flows present in the drill cores. To this end, three samples were selected from the Y-2 and Y-3 drill cores and selected minerals, zircon and sanidine, were extracted. The zircon was taken to the Sensitive High-Resolution Ion Microprobe-Reverge Geometry (SHRIMP-RG) in Stanford University and analyzed for its U content. The ages received indicate a need for further investigation, with the selected samples having similar eruption ages, but more scatter in the deeper flows, suggesting sourcing from a longer-lived magmatic system than shallower flows. Furthermore, zircon samples were U-poor, posing a challenge for high-precision ages. Future work includes more zircon analyses and analysis of Ar-Ar dating in the sanidine samples to corroborate the zircon eruption ages.

R253 Sustaining Connectivity of the Greater Sage-Grouse Ecosystem in Increasing Warming Scenarios

Macey Dvorak and Julie Heinrichs

Sergio Nicasio

Warner College of Natural Resources

Sustaining Connectivity of the Greater Sage-Grouse Ecosystem in Increasing Warming Scenarios

The transboundary corridor between northern Montana and southern Saskatchewan provides a significant and important ecosystem for migration of the Greater Sage-Grouse. Ecological habitat connectivity of the species is of great importance as well, and different parcels of protected areas are expected to change in importance of this connectivity under different warming scenarios. This project answers the question of if greater protection of conserved parcels of land, as denoted by IUCN categorization, are associated with greater connectivity of sage grouse as warming increases in the Saskatchewan-Montana corridor. Spatial data of

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protected areas, species habitat suitability requirements, and habitat suitability data was used in order to process and analyze data. The software Graphab was used to calculate key metrics for connectivity, which was then analyzed using QGIS to assess importance of nodes, links, as well as allowing the data to be visualized through mapping processes. Conclusions could lead to various implications for conservation, as well as recommendations for increasing areas of certain protection status in order to preserve connectivity as much as possible throughout this transboundary ecosystem.

R271 Facilitating Snow Leopard-Human Coexistence in Chang Tang

Matalyn Garcia

Veronica Yovovich

Warner College of Natural Resources

Research Poster

Snow leopards (*Panthera uncia*) roam the lands of Central and South Asia and have been the subject of conflict with the ranchers that inhabit the area. As humans encroach on their habitat through human expansion and livestock grazing conflict has increased. This has led to retaliatory killings, loss of wild prey, and habitat fragmentation. As climate change forces these cats to lower elevations, conflict with Tibetan pastoralists is on the rise. This has had devastating impacts on the goats, yaks, sheep, and cattle of the Changpa people along with a decline in a precarious snow leopard population. This project aims to illustrate effective ways for people in Chang Tang, China to coexist with their wild counterparts through non-lethal deterrent methods, environmental outreach, and financial tools.

F4 Subsurface: Exploring Our Fungal Foundations

Mila Garelle-Essam

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FILM

This film explores the somewhat hidden and overlooked realm of fungi. With relaxing, immersive visuals, the viewer is asked to consider how little we know about the world with the fungal kingdom as a prime example. In making this film I wanted to show people their inherent connection to nature, from the feeling you get watching butterflies in the forest to considering that your own body is an ecosystem. I hope that this film fuels curiosity and love for the land and the other voiceless beings who live here with us.

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R240 The Effects of Teeth Brushing on the Overnight Growth of Oral Bacteria

Lily Goodwin

Jennifer Riley

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Research Poster

Oral hygiene is essential for maintaining a healthy microbiome, as the human mouth harbors over 700 species of bacteria. This study investigates the effects of teeth brushing on the overnight growth of oral bacteria by analyzing the abundance of Gram-positive and Gram-negative bacteria before and after sleep. Three participants brushed their teeth for either one or two minutes, while a control group followed their normal brushing routine. Bacteria samples were collected both pre-bed and, in the morning, cultured on nutrient agar, and analyzed for colony growth. Results showed a significant increase in bacterial colonies overnight, with the highest bacterial counts observed in participants who did not brush before bed. The presence of Gram-positive and Gram-negative bacteria remained consistent across samples, but morning samples exhibited greater bacterial coverage on agar plates. Longer brushing durations resulted in fewer bacterial colonies in the morning compared to shorter brushing or no brushing.

R261 Interactions with multiple disturbances show understory communities response in forested ecosystems.

Grace Gordon

Trevor Carter

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Research Poster

Multiple disturbance ecology is a process in understanding the adaptability and response ecosystems must change and very important in the fight against climate change and destruction of biodiversity (11. Sommerfeld A, 2018). With an increase in human activity and climate change, crucial ecosystems are being targeted and impacted, these disturbances range from natural to industrial and have different outcomes (5. J.M Chase, 2003). This ecology specifically focuses on an area hit by different types of disturbances at different times of recovery. The geographic area of interest will be forest ecosystems in Northern Colorado, pulling specifically from and focusing on the Mt. Zirkel National Forest in the Northern part of Rocky Mountain

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National Park. (B. Buma 2012). This area was hit by three different disturbances at different times. Meaning different times of recovery for the understory (12. Carter, T 2024). Working directly with Trevor Carter together with the recently collected data by Trevor and other forest stewardship ecologists along with the original data from Buma, and original data from the Mt. Zirkel research (1997). The goal is to publish a working research project that sheds light on the idea of multiple disturbances to aid for future research to understand the complexity and various factors going into each ecosystem and its response to disturbances.

R228 How does inter-annual climate variation impact phenological cycles of Western Tanager (*Piranga ludoviciana*)?

Andie Hall

Anping Chen and Stacy Lynn

Warner College of Natural Resources

Research Poster

Western Tanager (*Piranga ludoviciana*) is a migratory songbird breeding in the western plains and coniferous forests of Colorado. This vibrant species' migratory timings are sensitive to climate variation and thus can serve as an excellent model for examining the effects of climate change on avian migration. In particular, studies have documented shifts in multiple phenological phases of this species over recent decades, raising concerns about disruptions in breeding cycles and population dynamics. This research leverage thousands of observations in the eBird citizen science database, complemented with literature review, to investigate how variations in average temperatures may determine the first observation of key annual phenological events, including spring arrival, fall departure, and breeding periods. By conducting statistical data analysis through linear modeling in RStudio to identify variance in patterns and visualization of eBird records from 1990 to 2015 alongside daily average temperature data from Colorado State University's Colorado Climate Center, we aim to identify trends in migration timing relative to temperature fluctuations. Understanding these patterns is crucial for predicting how climate change may impact species distribution, reproductive success, and long-term population stability. The finding of a somewhat cohesive correlation between daily average temperatures and arrival dates contributes to broader discussions on avian ecology and conservation efforts, providing insight into potential adaptive responses and informing future climate-related policy and management strategies.

R233 Taming Tensions: Identifying Conflict Between Livestock, Carnivores, and Native Ungulates

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Aidan Hallsworth, Emma Burdick, Hannah Bailey, and James Wiske
Cassandre Venumiere-Lefebvre, Matthew Hyde, and Stewart Breck
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Research Poster

Interactions between large carnivores, native ungulates, and livestock are critical to understanding wildlife-livestock coexistence in multi-use landscapes. For carnivores, previous studies suggest they may be drawn to cattle, possibly increasing predation risk. For native ungulates the spatial and temporal dynamics of interactions are unclear, but some work suggests native ungulates are displaced by cattle due to competition for forage. This study examined how carnivores overlapped in space and time with cattle, and whether cattle indirectly compete with ungulates by reducing access to shared forage resources. We analyzed two years (2023–2024) of camera trap data collected from June to November across three grazing allotments in southwest Montana’s greater Yellowstone ecosystem. Kernel density estimates and mean detection times were utilized to evaluate the spatial and temporal interactions between species, providing insights into predator-prey dynamics and habitat usage. Preliminary findings suggest limited overlap between carnivores and cattle. Ungulates, however, demonstrated reduced temporal overlap in cattle-occupied areas, suggesting they are being displaced. These findings highlight the complex dynamics of shared landscapes and provide insights to improve coexistence strategies. By addressing stakeholder concerns and collaboration with livestock owners, this research contributes to balancing agricultural productivity and wildlife conservation in the greater Yellowstone ecosystem.

R236 Bioinformatic Analysis of Crustacean Myostatin

Leah Hasstedt
Donald Mykles and Talia Head
Warner College of Natural Resources
Research Poster

Molting in crustaceans is the process through which a crustacean sheds its exoskeleton to grow. This process is hormonally regulated by two endocrine glands, the X-organ (XO) and the Y-organ (YO). The YO synthesizes and secretes molting hormones called ecdysteroids that cause an animal to progress towards molting. Molting is a cyclical process through which the YO transitions through four physiological states, basal, activated, committed, and repressed. Myostatin, also called growth differentiation factor 8 (GDF8), is characterized as an inhibitor of protein synthesis in muscles, however we believe that it may also play a role in the transition

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from the activated to the committed state in the YO. The purpose of this research is to characterize myostatin in crustaceans. Phylogenetic analysis of crustacean myostatin was inferred using a transcriptomic database from 189 crustaceans. Preliminary data suggests that crustaceans express two isoforms of myostatin, which differ by eight amino acids in the propeptide domain. Expression of myostatin in the YO of the blackback land crab, *Gecarcinus lateralis*, in response to the molt induction techniques multiple leg autonomy (MLA) and eye stalk ablation (ESA) was assessed from transcriptomic data. Future work will characterize the myostatin receptor, an activin type 2 receptor, to predict the role of myostatin signaling in the crustacean YO across the molt cycle.

R265 Human-Wildlife Conflict Plan: Bison in Yellowstone National Park

Elizabeth Hazard

Veronica Yovovich

Warner College of Natural Resources

Research Poster

The American bison (*Bison bison*) are an iconic wildlife species on the American landscape. They are symbols of the West and of conservation movements and agencies like the National Park Service. The area of Yellowstone National Park has been home to the bison since prehistoric times and became their last refuge when they were hunted to near extinction. However, the reality of the Yellowstone bison is much more conflicted than their romanticized legacy. For park visitors bison are an exciting and iconic aspect of the park, for park management they are an important part of an ecosystem and a wild animal with the potential to harm visitors, and for local ranchers they are the carriers of a disease that is detrimental to their cattle. The conflict between humans and bison is not just a conflict between wildlife and people, but also a dispute between different groups of people with different ideas for management approaches. This project aims to create a conflict management plan, exploring three distinct strategies for reducing conflict: financial/economic tools, physical/practice tools, and social/educational tools.

C12 Human-Bear Conflict Analysis in Summit County, Colorado

Ashley Hearnberger

Veronica Yovovich

Warner College of Natural Resources

Community Engagement Poster

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Black bear foraging affects rates of human-bear conflict. During years with poor forage, conflict rates increase as black bears turn to anthropogenic food sources. In this study, we investigated how natural forage rates influenced the human-wildlife conflict in Summit County, Colorado.

Patterns of black bear feeding based on forage have been studied. Bear fitness is affected by annual forage. Years with poor forage may increase rates of human-bear conflict as bears expand their range. Bears may take risks travelling into human spaces since there is no food available. In Summit County, the human population continues to grow, increasing recreators and citizens. We evaluated stakeholder groups to analyze varying human views to minimize human-bear conflict. Groups involved have varying levels of power and interest. We will minimize conflict by considering values of stakeholder groups. Three conflict levels are analyzed: dispute, underlying conflict, and identity-based conflict. A management plan was created to reduce conflict and ensure satisfaction using three tools: financial, physical, and social, to minimize conflict between bears and opposing stakeholder groups. Human-bear conflict is a wicked problem across much of the United States. By analyzing stakeholders in this high-conflict area of Colorado, we created tools that are applicable to other high-conflict areas. We aim to reduce risks for both humans and bears during poor forage availability and support wild populations.

C14 Managing Human-Cobra Conflicts in India

Justin Hu

Veronica Yovovich

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Community Engagement Poster

Human-snake conflict in India has become an on-going issue, with various cobra species contributing to over 50,000 snakebite incidents annually. As urbanization and agricultural expansion encroach upon natural habitats, encounters between humans and cobras have increased. These encounters have led to numerous fatalities, economic disruptions, and management challenges. Aside from their medical and economic impact, cobras hold significant religious and cultural value in India, which complicates conservation and conflict mitigation efforts. This study aims to examine key stakeholder groups ranging from local communities, healthcare providers, government agencies, conservation organizations, and the media to identify their perspectives, conflicts, and potential areas of cooperation. Potential conflict management strategies include improving access to antivenom, implementing public education initiatives, promoting non-lethal snake management, and balancing conservation priorities with human-safety concerns. By integrating scientific research, cultural considerations, and policy-

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driven solutions, this project aims to identify sustainable approaches to mitigate human-cobra conflicts.

R259 Seasonal and Diel Regional Temperature-Elevation Gradients across Northern Colorado

Ryder Hunt and Benjamin Thompson

Steven Fassnacht

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Research Poster

Air temperature decreases with increased elevation, and physics dictates that the change in temperature of free air is a function of the moisture in the air, called the lapse rate. For wet air, this is about 5.5 degrees Celsius per kilometer, and for dry air, it is about 9.8 C/km. However, for air temperature near the ground, this change in temperature with elevation can vary very locally, and even regionally. We used the hourly temperature data from 20 Natural Resources Conservation Service (NRCS) SNOTEL stations for six years (2019 to 2025) to assess the temperature-elevation gradient (Γ) over Northern Colorado. We also examined the fit of the Γ correlation from the Pearson correlation coefficient (ρ) as a function of time of day and time of year. It was found variability in the gradient (Γ) and in the fit (ρ) for day versus night (diel) and seasonally. Spring exhibited the strongest correlation (R^2) in a regression model of mean seasonal temperatures and elevation. Further, certain stations were persistent outliers from the Γ correlation. We examined the specific location and magnitude of those outlier stations.

R239 Investigating the effects of tiller number and time since emergence on *Bromus tectorum* seed size

Piper Kent

Jacob Courkamp

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Research Poster

Indaziflam has proven to be an effective herbicide at cheatgrass (*Bromus tectorum*) control but may leave plants behind after treatment. After anecdotal observations suggesting these escaped plants have many more tillers than untreated plants, we investigated the relationship between cheatgrass seed mass and the sequence of tiller emergence, hypothesizing that the later-emerged tillers of a plant would produce smaller seeds than earlier-emerged tillers. If

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true, producing many and smaller seeds may be a form of delayed-emergence bet-hedging, with smaller seeds lasting longer in the soil bank. Cheatgrass seeds were collected from Rinker Rock Creek Ranch, Idaho and Fort Collins, Colorado, vernalized for over a month, and propagated in the CSU Plant Growth Facilities greenhouse. We collected an average seed mass for each tiller of twelve of these plants, six from each source, and conducted an “lm” analysis of the results in R. We found a slight negative correlation between tiller sequence of emergence and average seed mass, but it was only statistically significant for the Idaho-sourced seeds. We conclude that harsher and more variable environments may select more strongly for this correlation and that managers may need to keep a close eye on escaped cheatgrass plants in case they need to re-treat.

R249 Diet Composition of Feral Horses and Mule Deer

Kelly Kramer

Saeideh Esmaeili

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Research Poster

This research investigates the diet composition of feral horses and mule deer in the Spruce-Pequop Herd Management Area (HMA). Our goal is to inform management groups on how to best manage lands inhabited by both species to prevent the decline of mule deer. We examined the diet overlap between feral horses and mule deer to determine if they compete for the same resources and whether this competition negatively impacts mule deer populations. Horses and mule deer have different digestive systems that influence their foraging behavior. Horses use hindgut fermentation, which extracts fewer nutrients from forage, requiring them to consume large amounts of vegetation to meet their nutritional needs. Mule deer are ruminants and can extract more nutrients from high-quality forage, allowing them to consume less overall. Horses may outcompete mule deer by consuming large quantities of forage, depleting resources that mule deer rely on. We analyzed 40 fecal samples using DNA metabarcoding to examine the diet composition of both species. Our results indicate that their diets overlap, especially during periods of low forage availability, which negatively affects mule deer survival and persistence. The results of our study convey the need for increased management of areas inhabited by both species.

C15 Desert Locusts in East Africa – Finding Common Ground

Olivia Linscomb

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Veronica Yovovich

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Community Engagement Poster

Schistocerca gregaria, a periodically swarming grasshopper found in the deserts and dry areas of Northern and Eastern Africa, has been an animal of concern for over a century. This species is known as the desert locust due to their frequent long-lasting swarms which devastate farmers' crops and cause mass malnutrition in East Africa. In my poster, I aim to address the economic, psychological, and ecological impacts that come with these swarms, what steps can be taken to mitigate the effects, and how to prevent harm from these desert locust storms. This research is significant due to the lack of past research done regarding preventative measures; research has primarily focused on reactive rather than proactive procedures. My research will focus on highlighting the needs of important stakeholders in the community and finding the common ground upon which solutions can be founded.

R257 Livestock Disease, Livelihoods and Ecology in Tanzania

Alexa Luna-Turner

Stacy Lynn

Warner College of Natural Resources

Research Poster

Can you imagine if every grocery store suddenly had no food? What would you do if you also lost your job and could not pay for anything? In the Simanjiro District of Tanzania, livestock are extremely important, especially for Maasai pastoralists, who rely on livestock as a major source of both food and income. One of the great risks to Maasai livestock is disease. These herds are composed mainly of cattle, goats, and sheep in order to act as a buffer against disease risks and forage shortages that may impact each species disproportionately. We examine how ecology, disease, environment, and people overlap. Specifically, we aim to investigate how impacts on livestock vary by disease and if the impacts vary by village location or livestock species. The interviews were converted into an Excel database, cleaned, and analyzed through RStudio. Most animals afflicted with "African Animal Trypanosomiasis," generally transmitted by the tsetse fly, recovered. In contrast, "Bovine pleuropneumonia," a highly contagious bacteria, resulted in the highest percentage of deaths, with cattle being the most impacted animal across all 3 villages.

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R266 Living on the Precipice: Perceptions of Human-Tiger Conflict in India and the Long Road to Coexistence

Ellie Lutz

Veronica Yovovich

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Research Poster

Human-tiger conflict is a pressing and wicked issue that has received extensive scholarly investigation. A great deal of analysis and research has been dedicated to understanding the diverse stakeholders involved and identifying pathways that incorporate their varied values, perceptions, and beliefs. Through a targeted literature review, this project synthesizes key differences and similarities in stakeholder perspectives to develop a hypothetical yet pragmatic wildlife management plan that balances these values while still forging a path forward for human-tiger coexistence in India. Grounded in the principles of collaborative conservation and various human-wildlife, particularly human-carnivore, coexistence practices, this project seeks to demonstrate that while conflict may never be fully resolved, it can be mitigated to a level that ensures most stakeholders feel heard and allows coexistence to remain a viable, though arduous, endeavor.

R280 Will Your Pennsylvania Walks Be Soiled? An analysis of how the changing Pennsylvanian soil conditions will affect native plants present throughout the state

Leanna MacBello

Warner College of Natural Resources

Research Poster

As the effects of climate change echo across the country, each region of the United States has endured different complications related to the changing Earth. Pennsylvania, a state that is usually covered with a cloud of humidity and rain due to its lush forests and proximity to major bodies of water, has been subjected to extended periods of droughts. These droughts have been practically unheard of in the region, with ecosystems taking severe hits due to lack of rainfall. As extended periods of dryness increase in frequency and intensity, effects have been seen everywhere, most notably, within the soil. As the soil consistency changes from its mineral-rich consistency to less nutritious, loose textures, one of the biggest concerns has been attempting to understand how the plants present in Pennsylvania, both native and non-native, will react to these changes. Within this preliminary observational experiment, Agastache

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(Hyssop morello) and Japanese Honeysuckle (*Lonicera japonica*) were placed in a range of soil types, including soils of their optimal consistency, clay soils with high water retention, and sandy soils that release water quickly. This experiment monitored the growth, measured by physical success and attributes, of each of the individual species to determine which genre of plants, native or non-native, would perform the best under a range of soils. As the effects of climate change echo across the country, each region of the United States has endured different complications related to the changing Earth. Pennsylvania, a state that is usually covered with a cloud of humidity and rain due to its lush forests and proximity to major bodies of water, has been subjected to extended periods of droughts. These droughts have been practically unheard of in the region, with ecosystems taking severe hits due to lack of rainfall. As extended periods of dryness increase in frequency and intensity, effects have been seen everywhere, most notably, within the soil. As the soil consistency changes from its mineral-rich consistency to less nutritious, loose textures, one of the biggest concerns has been attempting to understand how the plants present in Pennsylvania, both native and non-native, will react to these changes. Within this preliminary observational experiment, Agastache (Hyssop morello) and Japanese Honeysuckle (*Lonicera japonica*) were placed in a range of soil types, including soils of their optimal consistency, clay soils with high water retention, and sandy soils that release water quickly. This experiment monitored the growth, measured by physical success and attributes, of each of the individual species to determine which genre of plants, native or non-native, would perform the best under a range of soils.

R238 Analyzing Participation Patterns Across Citizen Science Projects on CitSci.org

Melissa May

Gregory Newman

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Research Poster

Citizen science (CS) has emerged as a valuable tool for addressing knowledge gaps in ecological research by engaging non-experts in data collection and analysis. However, the effectiveness of these initiatives varies significantly depending on project design. This study examines engagement behaviors on CitSci.org, exploring how project characteristics—such as field of study, recommended age group, and difficulty level—affect user participation. Data from 1,414 CitSci.org projects spanning various scientific disciplines were standardized to ensure consistency across categorical variables, including field of study, difficulty level, and target age demographic. Statistical and comparative methods were then employed to assess participation trends across different project characteristics. Results indicate that plant (22.3%) and water (20.1%) projects dominate the platform, while most projects are categorized as medium (50%)

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or easy (46%) in difficulty and predominantly target adults (52.4%). These findings suggest that CitSci.org projects tend to prioritize accessibility while emphasizing biodiversity and hydrological observations. By identifying key patterns in participation, this research can help inform the design of more inclusive and effective citizen science initiatives. Enhancing project accessibility and aligning research topics with participant interests may ultimately strengthen public engagement in ecological monitoring, improve data collection efforts, and support broader environmental stewardship worldwide.

R234 Effects of drying on lowland tropical root biomass in Panamanian rainforests

Maya McCain, Ally Lewis, Daniela Cusack, Grace McLaughlin, Hailey Tharp, and Olivia Aaron

Daniela Cusack

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Research Poster

Ecosystems worldwide are being affected by disturbances brought on by global change, such as drought and chronic drying. The effects of drying on tropical rainforests remain poorly understood, despite the importance of these ecosystems in the global carbon (C) budget, in particular because of their large root biomass and transfers of C into soil long-term C pools. Drought and chronic drying are predicted to increase in tropical regions due to global change, motivating the Panama Rainforest Changes with Experimental Drying (PARCHED) project across four distinct lowland, seasonal forests across the Isthmus of Panama. The project simulates chronic drying by excluding ~70% of throughfall from forest plots, paired with control plots (32 plots total). We addressed the uncertainty in rainforest root responses to chronic drying by processing root samples from the four PARCHED forest sites. We assessed how root dynamics differ between drying treatment versus control plots during the wet season. Results to date indicate that the four forests have different baseline root biomass stocks, related to local moisture and soil fertility. Root biomass has also generally declined in the drying treatment. Our results have implications for the future of C storage in tropical forests under a changing climate.

R247 The Effect of Natural Food Availability on the Diet of Black Bears in the Methow Valley

Alex McDulin and Rebecca Windell

Rebecca Windell

Warner College of Natural Resources

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Research Poster

Black Bear (*Ursus americanus*) use of human populated areas is affected by many factors, including natural food availability, behavioral differences, climate, and proximity to human development. Our goal for this study is to understand how changes in black bear diet composition relate to variation in natural food availability, proximity to human development, climate, and bear behavior during the summer and fall months. We used black bear scat samples collected along 1 mile transects by community volunteers to assess their diet using morphological diet analysis. To do this, we measured the volume and mass of each scat as well as the individual diet components such as non-food items, plant material, mammal remains, and berries. Of these individual diet components, we focused on black bear diet in relation to berry availability, the primary source of natural food during the summer (and fall) months. The relative abundance and phenology of five fruiting shrubs important to black bears - Serviceberry (*Amelanchier* spp), Elderberry (*Sambucus* spp), Dogwood (*Cornus* spp), Chokecherry (*Prunus virginiana*), and Currants (*Ribes* spp) – were measured along these same transects by community science volunteers. The results of this study will help us understand the relationship between berry abundance, bear diets, and how this relationship might be further impacted by human-driven changes to the landscape. It is more important now than ever to understand why bears are willing to enter human-populated areas because summers in the Methow Valley are getting more intense and the landscape is changing.

R281 Assessing Range Rider Programs in Northeastern Washington: Enhancing Effectiveness in Human-Wildlife Conflict

Maddie Mcneil

Warner College of Natural Resources

Research Poster

With the reintroduction of wolves in many places in the US it is important to find methods that can mitigate conflict between humans and wildlife and capitalize on the ones that are effective. Working with the CHCC, the center for human carnivore coexistence, I was able to review the two range rider programs in northeastern Washington to see what works well and where improvements can be made to the program. In this assessment, interviews were conducted with range riders, program directors, and officials at various levels of government. The interviews were analyzed, and common themes were identified from the interviewee responses regarding the program's effectiveness. One of the most prevalent perspectives shared was that to have an efficient and effective program it is important to provide the ranchers and range riders with clear funding allocations and enough funding so they can do high-quality work to

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mitigate conflict. By allowing these changes, range riders can feel supported and confident that they will get paid on time, have increased safety measures such as the ability to ride in pairs, and allow old and new riders to get the assistance they need to learn and improve their skills to better improve their performance on the job. Reviewing these programs is crucial as other states implement similar programs and it is important for other organizations to take these considerations into account as they not only help move past initial barriers, but they can hopefully lead to more effective and efficient range rider programs.

R269 Vultures, Cattle, and Compromise: Managing Vulture Conflict in the American Midwest

Katie Mills and Kenneth Speirs

Veronica Yovovich

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Research Poster

The expanding range of Black Vultures has led to increasing instances of human-wildlife conflict, particularly in relation to livestock production. Although Black Vultures are primarily scavengers, their aggressive behavior of mobbing and targeting vulnerable animals, such as newborn or weakened calves, has raised concerns. These vultures, which typically serve an important ecological role in carcass disposal and disease prevention, have become a source of animosity due to perceived threats to livestock health and economic losses. This project uses a thorough examination of current literature to understand the growing tensions between Black Vultures and ranching communities. By exploring the underlying causes of these conflicts and the impacts, we aim to provide a balanced perspective on the ecological importance of vultures while addressing the needs of livestock producers through an analysis of conflict mitigation tactics and preventative management.

R243 Ecosystem Responses to Extreme Drought in a Semi-arid Grassland.

Neva Morgan

Jordan Siggers

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Research Poster

Semi-arid grasslands are projected to be impacted by more frequent and severe climatic extremes, such as drought. These ecosystems are major contributors to global carbon storage

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and are highly responsive to variable precipitation regimes given their persistent water limitation. Extreme drought has proven to drastically alter ecosystem properties, such as nutrient availability and soil moisture, with potential consequences for ecosystem functionality. Further, native plant species facing intense water stress are likely to shift in abundance, creating opportunities for advantageous invasive species to establish and facilitating changes in plant community composition. Our study was initiated in a Northern Colorado semi-arid grassland, where experimental extreme drought conditions were imposed during the 2024 growing season. Preliminary results from a single year of experimental drought show substantial decreases in soil moisture and plant productivity, along with altered nutrient availability. Shifts in droughted plant communities are subtle relative to controls, however, differences are expected to be magnified by a second year of drought given increasing invasive propagule pressure in the surrounding pasture. Hence, this study will continue across two more growing seasons, with an extreme rainfall event added during the second growing season to assess interactions with drought. Understanding semi-arid grassland responses to altered precipitation regimes can inform farmers, ranchers, and land managers of how to prepare for and mitigate the detrimental effects of an increasingly unpredictable climate.

O25 Ballet History through a Queer Lens

Oliver Myers

Leah Holz

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Oral Presentation

My Honors Thesis explores ballet history with a focus on queer themes, culture, and figures. I am conducting intensive research, through a combination of literature review and creative research on the queer history of ballet. This research is important because ballet history, as taught in the 21st century, relies upon cisheteronormativity to uphold a status quo within modern day ballet culture and industry. There is a growing body of queer ballet work and an increasing number of professional ballet dancers who openly discuss and perform their queer identities. However, these instances are often presented as novel to ballet. My research indicates that queer culture has long impacted and intertwined with ballet history. Herein lies the question central to this research: "how does the history of ballet demonstrate that cisheteronormativity is not foundational to the artform?". I will synthesize this research by creating an easily accessible virtual archive or reference of queer ballet history. It is important that this resource is easily accessible to an audience outside of academia because much of ballet education is conducted at private studios. To fulfill the Honors Thesis requirements, my final written component will be a literature review which presents the information collected for the virtual reference in a more academic format. I also plan for this research to be the

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foundational dramaturgy to support my Dance Capstone Concert work, which I will complete in the fall semester of 2025.

R229 Avian Migration Under Artificial Skies: A Study of Light Pollution's Ecological Impacts

Leona Myers

Anping Chen

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Research Poster

Artificial light at night (ALAN) has been shown to disrupt biological rhythms in migratory birds, yet its effects on migration timing across large geographical ranges remain unclear.

Understanding these effects is critical for assessing human-induced impacts on avian migration and informing conservation strategies. This study examines how ALAN influences stopover rates of Yellow-rumped Warblers (*Setophaga coronata*) and Barn Swallows (*Hirundo rustica*) along an urban to rural gradient using eBird observational data (2012–2022) and ALAN exposure levels derived from NASA satellite imagery. Data processing included filtering for migration seasons, categorizing urban and rural counties, standardizing observation counts, and analyzing bird migration stopover rates relative to light pollution intensity. Welch two-sample t-tests were conducted to compare stopover rates between species and between urban and rural counties. Preliminary results show no significant differences in stopover rates between urban and rural counties, nor between Yellow-rumped Warblers and Barn Swallows in urban areas. These findings suggest that ALAN may not significantly affect migration timing or stopover behavior in the species studied, at least under the conditions observed. Future research should focus on expanding sample sizes, refining methods for measuring stopover behavior, and exploring other environmental factors that may influence migratory patterns.

R248 Screening Wheat Varieties for Aluminum Toxicity Tolerance in Acidic Soils and the Role of ALTM1

Giovanna Paterno

Richard Mason

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Research Poster

As soils around the country are growing in acidity, the threat of aluminum toxicity inhibiting wheat production rises. At a pH of four, aluminum exists as Al^{3+} , a much more soluble form

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that inhibits the growth of roots. Because of this, it is essential to offer local farmers varieties of wheat with aluminum toxicity resistance. The ALTM1 has been found to be associated with the aluminum toxicity trait. As such, the CSU Wheat Breeding Program is interesting in understanding the genotypic and phenotypic relationship with the ALTM1 gene, with hopes to breed varieties specifically for aluminum resistance as to meet the needs of growers.

O26 Going Fishing: What you should know about your favorite fishing spots.

Mitchell Pederson

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Oral Presentation

The sport of fishing has a long tradition and history in many human cultures. The state of Colorado is no exception. Colorado Parks and Wildlife lists approximately 6,000 miles of stream water and 1300 lakes and reservoirs where people can catch more than 35 different species of fish. However, with the advent of new technology, water pollution has become one of many concerns in the long-term health of natural habitats. This can be especially dangerous for people who fish for food. This study aims to analyze the significance of water contamination and its possible effects on the fish that inhabit the water systems.

R232 Changes in Ecosystem Services Provision and Well-being in Beni, Bolivia

Aldair Perez

Claudia Baudoin Farah

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Research Poster

The Grupo de Trabajo para los Llanos de Moxos (GTLM) is working on the conservation efforts in Bolivia. Some residents were involved in assessing the state of ecosystem services (ES) and their impact on well-being. We are looking at how changes in ES affect the well-being of local populations in the Llanos de Moxos region. The residents were categorized, the ES were listed, 5 social variables to well-being were formed (income, health, security, freedom, quality of social relations), and meetings/workshops/interviews were held. The responses were inputted via Excel and the data was analyzed based on qualitative and quantitative analysis, including finding themes and making tables to organize the results. The results showed that the ES are mostly being negatively changed, which affects the well-being. This information helps identify main trends and drivers to each ES. There are similarities in problems, such as extreme weather

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harms the food supply towards farms and fisheries. Overall, solutions are needed, whether that's implementing the technology/knowledge, implementing laws to protect the environment, and possible relocation from high-risk areas. This would require teamwork among the residents, government, scientists, and engineers in order to improve the conditions for each ES.

R262 Spruce Beetle Mortality Shows Limited Impact on Forest Fuel Loads

Madi Pinney

Trevor Carter

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Research Poster

Forest disturbances impact ecosystem dynamics, with single events causing economic and ecological consequences, yet their interactions can lead to multiplicative effects. However, we know little about the mechanisms that link widespread disturbances in the subalpine environment. This study examines the connections between spruce beetle-induced tree mortality, soil moisture distribution, and woody debris accumulation in high-elevation spruce-fir forests of the Medicine Bow Mountains, Wyoming. Spruce beetles cause tree mortality in western North American forests, with outbreaks intensifying due to warming temperatures and drought conditions. While previous research has documented changes in forest structure and understory vegetation following beetle outbreaks, the hypothesized mechanisms linking these disturbances to increased fire susceptibility, specifically the relationship between post-outbreak microclimate conditions such as soil moisture and fuel accumulation patterns, remains poorly understood. Using data collected at the Glacier Lakes Ecosystem Experiments Site (GLEES), this research examines how soil moisture and fuels vary across a gradient of beetle-caused mortality. Presently, we build upon earlier work that established significant understory vegetation changes following spruce beetle outbreaks, focusing on how these structural alterations influence fine fuel characteristics that may increase fire ignition potential and spread. We observed no statistically significant relationships between soil moisture, fuels, and overstory mortality. Our findings suggest that the dynamics of fuel accumulation following beetle outbreaks may be more complex than previously assumed, potentially influenced by other environmental factors beyond tree mortality. This work challenges assumptions about post-disturbance fuel accumulation and may help refine fire risk models in western forests affected by spruce beetle outbreaks.

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R246 Recovery of the Soil Seed Bank in Terms of Functional Diversity in a Semi-Arid Grassland

Izabella Rhomberg and Melinda Smith

Madelyn Amick

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Research Poster

The severity and duration of drought is predicted to increase, and with this plant communities are predicted to change in terms of their functional traits. The recovery of the plant community post-drought will be impacted by the variety of functional traits available during the recovery period. The soil seed bank, the cache of dormant seeds in the soil, will likely play a role in this recovery. However the seed bank itself may be affected by drought, limiting the traits available during recovery. The goal of our study is to compare the effects of extreme drought on the functional traits of the seedbank and determine its ability to recover within a year. To do this, we collected soil seed bank samples two times after a four year drought experiment conducted in a semi-arid grassland in Northeastern, Colorado: at the beginning of the growing season after the drought (May 2023), and at the end of the growing season (Oct 2023). Samples were collected and grown in the greenhouse for species identification. We assessed each species' origin, life history, photosynthetic pathway and functional type. We found that the previously droughted seedbank was depleted across functional traits, but that there was recovery across all functional traits except for perennials within a single growing season. The impact of this recovery on the plant community is yet to be seen; however, this recovery does suggest a beneficial role of the seed bank in coming years.

R267 Fins and Fear: A Dive Into Human-Shark Conflict

Jordan Rivera

Veronica Yovovich

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Research Poster

For decades, sharks have been presented in the media to be monsters from a deep blue world. Pictured with sharp teeth and daunting fins, sharks have been portrayed as villains to be feared. This viewpoint, however, is the true danger as sharks are poorly represented in conservation due to deeply felt beliefs, values, and fears around this critical marine animal. Sharks such as the white shark (*Carcharodon carcharia*), also known as the Great White Shark, are important

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species in Australia; their presence is critical to ecosystem health, but there are many perspectives on how sharks should be managed when it comes to human-shark interaction. This poster will explore the levels and key stakeholders involved in human-shark conflict in Australia. It will also evaluate three potential approaches to mitigating human-shark conflict including economic, practical, and social aspects of the issue.

R273 Increased Carbon Utilization Efficiency of *Nannochloropsis oceanica* Cultivation

Innagen Roberts and Emma Post

Xingfeng Huang

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Research Poster

Algae has significant potential for use as biofuel, food supplements, and various other materials. However, large-scale cultivation can be costly and resource-intensive. Generally, the productivity of algae tends to decline after one to two weeks of initiating a culture due to increased competition for light and nutrients. To achieve high algal biomass productivity, light must penetrate the entire body of water in which the algae reside; in this experiment, we used 75-liter mini Raceway ponds. To test this hypothesis, we sought to reduce intraspecific competition of *Nannochloropsis oceanica* by increasing the frequency of pond dilutions to maintain a baseline optical density (OD) of 0.8 at 750nm, conducted once, twice, and three times daily. The liters of algal biomass extracted from the ponds were processed through a dewatering module, and the *Nannochloropsis* cultivation medium was recycled back into the Raceway pond. In addition to the OD measurements, we collected data on total organic carbon (TOC) and accounted for the liters removed during each harvest. Utilizing a single-factor ANOVA test, our results indicated no significant effect on algal productivity among the three treatments ($p=0.0699$); however, further research involving different algae strains, larger sample sizes, and an automated harvesting system could be valuable next steps.

C17 Considering multiple perspectives in managing invasive feral hogs in the U.S.

Paisley Sayers

Veronica Yovovich

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Research Poster

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Invasive feral hogs (*Sus scrofa*) are rampant across much of the Southern United States. They cause substantial levels of economic and ecological damage and are a prime example of human-wildlife conflict. Feral hogs damage crops, land, property, public areas, carry dangerous diseases that threaten livestock and humans, and compete with native species. While lethal control has been the primary method of dealing with feral hogs by both state wildlife agencies and the USDA, it is proving largely ineffective. The goal of this project is to find a new strategy that builds off the successes of previous methods while taking into consideration about a dozen stakeholders. The final plan will include multiple types of tools, viewpoints from various groups, useful practices that are already in place, and considerations for the future. Though feral hogs will never fully disappear in the United States, it is critical to continue searching for novel ideas that will improve conditions and ideally benefit the livelihoods of stakeholders involved.

R242 Quantifying Potential Changes in ET Following Tree Damage in South African Savannahs

Gloria Tait and Marinda Chin

Jody Vogeler and Steven Filippelli

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Research Poster

Stakeholders at Kruger National Park, located in the upper eastern corner of South Africa, noticed an increasing amount of damaged trees, even after the implementation of protections. As elephants and droughts impact the environment, detecting potential changes in ET due to this tree damage can be ever useful for informing stakeholders. This project questions the possibility of quantifying changes in Landsat-derived estimates of evapotranspiration (ET) in trees following tree damage from elephants and drought-related stress. On-ground data on the tree location and damage severity was collected by stakeholders in 2023 and 2024. In conjunction with the METRIC model, the mean ET was extracted from 40 patches, where all trees were digitized and had a recorded damage status. Then, all data was analyzed in models that showed changes in ET over time concerning the trees' damage status. Results indicate a low correlation ($r = -0.06$) between the percent of patch area with severe damage and change in ET between 2017 and 2024. Implications of this study suggest that further research is needed to determine if measuring ET changes corresponding to tree damage is possible and/or if tree damage does not significantly affect ET. It is recommended to explore any additional environmental variables and refine models for stronger predictions of tree damage and ET changes.

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O24 Using Citizen Science Data to Explore Immature Monarch Presence on Different Milkweed Species

CeLee Terasa

John Mola and Laura Lukens

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Oral Presentation

Monarch butterflies (*Danaus plexippus*), an iconic insect pollinator, are declining due to climate change and habitat loss. Their larvae exclusively feed on milkweed (*Asclepias*) host plants, sequestering toxic cardiac glycosides for defense against predators and parasites. With monarchs recorded on 73 milkweed species in our dataset, we ask: Are immature monarchs more likely to be present on certain species, and does this differ between native and non-native milkweeds? Furthermore, how do spatial or temporal patterns influence monarch presence?

While lab studies have tested monarch preference for a few milkweed species, large-scale field investigations remain scarce. To address this knowledge gap, we analyzed 15 years of citizen science data from the Monarch Larva Monitoring Project (MLMP) and the Integrated Monarch Monitoring Program (IMMP), spanning the contiguous U.S. We hypothesize that immature monarch presence varies by milkweed species, region, and season.

Preliminary results of our study suggest that *A. curassavica*, a non-native species, harbors far more monarch eggs and larvae than native species. Meanwhile, we are continuing to analyze spatial and seasonal patterns using GIS applications to better understand regional variation in milkweed species related to monarch presence. As non-native milkweeds become more widespread, further research is needed to determine factors driving monarch presence for these species and their potential effects on survival, fitness, and population dynamics. These findings can inform conservation efforts by identifying milkweed species that best support monarchs across different regions and assessing the ecological implications of non-native milkweed in both natural and urban landscapes.

R230 Effects of Indaziflam on Native Species Seed Emergence

Sammy Tetrault

Cynthia Brown, Lauren Myers

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Research Poster

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Bromus tectorum (cheatgrass), is an annual grass and invasive species that increases risk and severity of wildfires. Indaziflam is a pre-emergence herbicide that is soil applied and inhibits cellulose production, preventing radicle formation. Indaziflam is effective against *B. tectorum*, but it is not clear how it affects other species. The purpose of this study is to identify the impact of indaziflam on emergence for 11 native and 3 invasive species, including *B. tectorum*, used as a positive control. To further our understanding of impacts, we investigated the interactions between functional group & rate and seed size & rate. Functional groups included invasive and native grasses and forbs. For our study, we sprayed indaziflam at varying rates (0 fluid oz/acre - 7 fluid oz/acre (2× normally applied rate)) on two types of trays, topsoil and sand mix. For each of 3 repetitions, we had 10 trays of each soil type. We took daily measurements of emergence, height, injury symptoms, and true leaf emergence. Using this data, we created generalized linear models in R. Our results indicate that there are significant interactions between rate & functional group and rate & seed size. Our model suggests that forbs may be more resilient than grasses and that small seeds may be more resilient than large seeds. These results can be used by land managers to better understand vulnerable species, and to inform application and restoration seeding timing, so as to mitigate harm to native species.

R260 Variation in Root economic strategies in wind exposed alpine ecosystems with wind disturbance exposure

Hailey Tharp

Trevor Carter

Warner College of Natural Resources

Research Poster

High winds across the alpine are a persistent disturbance to plant communities in the area. Wind can cause chronic damage to plant tissues and therefore affect how plants best allocate resources and their subsequent strategies of nutrient acquisition. In the face of disturbance plants tend to favor rapid-growth strategies that extend root length and lower root tissue density. To examine how Krummholz tree islands block the wind from understory plant communities, we evaluated variations in the functional traits associated with resource acquisition: specific root length (SRL), root tissue density (RTD), root diameter (RD), root dry matter content (RDMC), root nitrogen concentration (RN), leaf dry matter content (LDMC), specific leaf area (SLA), plant height at maturity (height), and leaf nitrogen concentration (LN). Differences in average trait values were correlated to the position of the understory relative to

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tree islands. This demonstrates that tree islands that block the wind can alter how wind affects understory community assembly.

R250 A habitat suitability framework for the preservation of the California endemic and endangered species *Dirca occidentalis*

Ava Tolbert

Sandra Duran Mancipe

Warner College of Natural Resources

Research Poster

Dirca occidentalis populations are decreasing, and are only found in a select number of areas in the San Francisco Bay Area. This deciduous shrub is an endemic species that has been classified as rare, threatened, or endangered in California and elsewhere. Population declines are due to habitat loss and fragmentation, slow growth rate, and poor seed dispersal and germination. Humans also pose threats to the species populations through trail use and off-trail trampling. Most community observations show very small, isolated populations. It is important to identify potential habitat areas for *D. occidentalis* to increase its population size. In order to determine these areas, suitability criteria for the growth of *D. occidentalis* must be established. This criteria will be used to create a habitat suitability framework, through the assistance of spatial analysis. The identified habitat areas will determine where *D. occidentalis* can be planted in the future, and monitored over time. The preservation of *D. occidentalis* is the first step in preserving the many diverse and unique ecosystem types within the Bay Area.

R274 Fine-scale inter-pool movement of creek chub (*Semotilus atromaculatus*) in response to white sucker (*Catostomus commersonii*) presence

Kace Vazquez del Mercado, Evan Bolstad, Moira Benish-Kingsbury, and Ryan Edgar

Yoichiro Kanno

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Research Poster

Understanding the fine-scale movement of a particular fish species in riverine systems provides insights into its habitat preferences, migratory routes, and critical life stages. This is crucial for maintaining habitat connectivity, ecosystem health, and supporting biodiversity. We investigated whether the presence of *Catostomus commersonii* influences the fine-scale movement of *Semotilus atromaculatus*. We collected fish of both species between 70mm to

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110mm in length from Spring Creek in Fort Collins, CO, and PIT tagged them with 12mm HDX tags. The fish were then split into two groups of $n = 40$; a control group consisting of all creek chub and a trial group consisting of half creek chub and half white sucker. They were introduced into two experimental mesocosm tanks, each consisting of two pools connected by an inhospitable riffle. The connecting riffles were equipped with PIT tag antennas to track fish movement between pools. We found that creek chub in sympatry with white sucker moved more between pools than creek chub in allopatry. Creek chub size was not statistically significant in movement occurrences or duration.

C13 Human-Moose Conflicts In Colorado

Carolina Vear

Veronica Yovovich

Warner College of Natural Resources

Community Engagement Poster

Moose-human conflicts in Colorado, particularly vehicle collisions and aggressive encounters, present growing challenges for both wildlife conservation and public safety. This project examines how seasonal moose movements, snow depth, human reactions, indigenous practices, and human driving patterns contribute to human-moose interactions. Using GPS tracking and snow distribution models, researchers found that moose migrate to lower elevations with higher road densities as snow deepens, leading to increased road crossings and collision risks. Most MVCs occur at night when visibility is low, with risk peaking when snow depth is below 120 cm. These findings have direct implications for conflict mitigation in Colorado, where expanding road networks and rising moose populations increase the likelihood of human encounters. Understanding the environmental and behavioral factors can inform targeted interventions, such as seasonal traffic adjustments, improved road signage, and wildlife corridors. Additionally, insights into moose movement patterns may aid in managing aggressive encounters, as seasonal shifts in habitat use could influence human-moose interactions beyond roads. By integrating ecological data with human activity patterns, this research contributes to a broader conflict management strategy that prioritizes both public safety and wildlife conservation in Colorado's changing landscape. The public can underestimate the risks and lack knowledge of effective mitigation strategies. Seasonal awareness programs, improved road safety measures, and conservation strategies can help reduce conflicts while maintaining ecological balance.

R268 Frozen Frontlines: Navigating Conflicts in Polar Bear Conservation

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Karly Vizzini and Claire Nelson

Veronica Yovovich

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Research Poster

As Arctic ice continues to decline due to climate change, polar bears (*Ursus maritimus*) are spending more time on land, increasing encounters with human communities. Churchill, Manitoba, a hotspot for polar bear-human interactions, faces mounting challenges as stressed and food-deprived bears pose risks to residents. This project examines the complex network of stakeholders involved in managing these conflicts—including scientists, Indigenous groups, government agencies, conservation organizations, and industry players—and proposes innovative new strategies to enhance the current management plan.

C18 Proposal to Address Human-Wildlife Conflict with Kea (*Nestor notabilis*) in New Zealand

Sam Voetberg and Alessandro Hernandez

Veronica Yovovich

Warner College of Natural Resources

Community Engagement Poster

Kea (*Nestor notabilis*) have been a problematic species in New Zealand for centuries. Historically, large numbers of sheep deaths were attributed to kea attacks, leading to persecution of these gorgeous birds. Today, their curious nature results in many considering them a destructive pest species. They're known to damage property (especially vehicles), rummage through trash, and steal items of interest. Using collaborative decision-making to integrate the perspectives and interests of diverse stakeholders, we propose a methodology that emphasizes economic and social satisfaction while also supporting the ecological and environmental needs of kea. We provide examples of solutions to the conflict, including economic, practical, and psychological tools that ensure the satisfaction of all stakeholders involved. We hope that community-led decisions will support kea populations and improve public opinion regarding the conflict.

R225 The importance of identifying individuals from video logs to describe underwater behavior in dolphins

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Eden Vron dran, Catalina Mazariegos Mejia, and Jaelynn van Melle

Shane Kanatous

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Research Poster

This presentation will introduce how we catalog information from videos of underwater dolphin behavior. Each videolog (GoPro video), is about 30 minutes long and follows up to 18 dolphins in a captive setting. In our analysis, we document the exact time a dolphin appears on screen, down to the very second. We record which body part enters the frame first (e.g. rostrum, fluke, left or right pectoral fins (according to the dolphin's view), dorsal fin) and the precise location on the screen (left, right, top, bottom, corner, or center). From there we track the dolphin(s) until they exit the frame and record that time. While a dolphin is in view, we try to identify individuals based on physical markers. We look at permanent features such as fin and fluke shapes, including notches or birthmarks, as well as temporary rake marks from social interactions. Since some marks fade over time, we take note of the most reliable identifiers. Knowing the dolphins' family trees also helps confirm relationships and ages, which gives us additional insight and potential for interpretation of social relationships. These videos provide valuable insight into dolphin swimming patterns, both socially and positionally, two closely connected aspects of their behavior. They also serve as an important educational tool, introducing students to different methods of scientific research.

R272 Managing Bison-Human Conflict in Yellowstone National Park

Kay Wayman

Veronica Yovovich

Warner College of Natural Resources

Research Poster

Yellowstone National Park is the world's first National Park, established in 1872 and contains 2.2 million acres of natural area that serves as home to many incredible wildlife species, including deer, elk, wolves, and bison. In the 2024 season, the park saw more than 4 million visitors from around the world. Despite park regulations requiring guests to maintain a distance

of at least 23 meters from all wildlife, each year averages four incidences of bison-related injuries each year due to guests approaching wildlife. This project assessed data collected across the span of the park's life, analyzing the activities surrounding the injuries, type of injury sustained, as well as age, and whether they were American or foreign visitors to the park, and

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provides suggestions on how to manage the conflict between human visitors and bison residents.

R252 Phenological Shifts in Quaking Aspen (*Populus tremuloides*) Across Colorado's Differing Climates

Mason Whitney and Louisa Beckett

Sarah Hart

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Research Poster

Quaking Aspen is a keystone species of forests in North America and serves as a strong indicator for climate change impacts but autumn phenological events such as leaf color change and drop are still understudied across different climates. This project looked at how climatic factors of precipitation and temperature impact these timings in Colorado and how the understanding of aspen in relation to climate can be expanded. The data collected was weekly phenological data (leaf color change, drop) across twenty aspen trees using Budburts's citizen science platform. Tree measurements (DBH, canopy) were gathered as historical data from the PRISM climate group. These climate variables were linked to each of the tree locations through Rstudio and will assess the relationships between the phenological events and climate factors. These findings show earlier leaf senescence in colder regions and a lower variation in leaf drop when higher precipitation exists. The results will show the climate drivers of aspen autumn phenology and can provide insights into the resilience of aspens as well as future management strategies for climate change. This study shows the value of citizen science looking at ecological changes and urges expanded research on these systems.

R258 Perceptions of Cultural and Ecological Preservation in Rock Climbing.

Rowe Wilson-Scott

Stephanie Moreira

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Research Poster

Rock climbing has become an increasingly popular outdoor sport since the 1950s, often using public lands and protected areas of the U.S. This project explores the current perceptions rock climbers have about the tradeoffs they are willing to make to preserve the cultural and environmental integrity of the area. By surveying members of the CSU Alpine Club on a trip to

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Vedauwoo climbing area, we hope to gain further insight into solutions that serve both rock climbers and Indigenous communities who share the land. The results of the survey will suggest whether rock climbers are more aware of the impacts of climbing and are willing to climb in more sustainable ways following the trip.

O22 Grizzlies & Black Bears: Rivals or Roommates in Southwestern Montana?

James Wiske and Emma Burdick

Cassandre Venumiere-Lefebvre

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Oral Presentation

In ecosystems where carnivore species coexist, interspecies interactions are influenced by a variety of ecological factors (e.g., time of day and habitat type). This study focuses on the interactions between grizzly bears (*Ursus arctos horribilis*) and black bears (*Ursus americanus*) and factors that impact interactions. The findings from our research are important to inform livestock producers in the area of bear behavior and distribution, as well as to fill gaps in knowledge regarding the two species. We expect to see grizzly bears displace black bears where the two species traditionally overlap in habitat types. Our study occurred in the Ruby River and Madison River sub-basins in Southwestern Montana, roughly 60 miles west of Yellowstone National Park. We placed sixty-five camera traps in a study grid with each grid encompassing 2.5km². Our study area is grazed by cows and sheep from mid-June through mid-October. Based on the results of single-species occupancy models on both individual bear species to determine covariates influencing their presence, we seek to identify predictors of interactions between the two bear species. Possible covariates affecting the presence of these two species include tree canopy cover, distance to human development, distance to water, and time of day.

R279 Conflict Management Plan for Leopard-Human Conflict in South Africa

Katherine Witkind

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Research Poster

Human-wildlife conflict is a pervasive and ongoing issue in our world today. This poster will represent a comprehensive case study of the leopard-human conflict present in South Africa today. Analysis of multiple stakeholder groups in the affected area and potential solutions will

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be implemented. Drawing from current and past research on the topic, a plan will be created on how to not only break down the layers of conflict between opposing stakeholders, but also to suggest ways to form open and trusted communication between parties.

R235 Do invasive species influence recovery from drought? Recreating the Dust Bowl in a world without Salsola

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Emmet Tooley

Warner College of Natural Resources

Research Poster

Climate change is expected to increase the frequency of extreme droughts in grasslands. Such events may push ecosystems across critical thresholds, leading to shifts in plant community structure. For instance, prior research in the Colorado Shortgrass Steppe showed a collapse of C4 grass dominated plant communities following a 5-year experimental drought and a shift to communities dominated by weedy annual forbs with 3-4 times greater productivity than non-droughted prairie. However, the impact of this regime shift on post-drought recovery is unknown. Here, we investigated the removal of the invasive forb *Salsola tragus*, the dominant species following this 5-year drought, on the recovery of this grassland during the 2024 growing season. Our analysis suggests that *S. tragus* removal did not affect the recovery of dominant C4 grasses or their productivity, with both variables showing minimal recovery independent of removal. Additionally, *S. tragus* removal did not influence the recovery of subdominant C3 grasses. While cover and productivity of native ruderal forbs increased marginally with *S. tragus* removal, this increase did not compensate for the contribution of productivity by *S. tragus*. As a result, ecosystem carbon uptake (estimated from total ANPP) was lower in plots with *S. tragus* removal compared to plots containing *S. tragus*. Overall, our results suggest that the removal of *S. tragus* did not influence the recovery of dominant species and reduced ecosystem carbon uptake. However, recovery of plant community structure was minimal for both treatments. Thus, additional years of data collection are needed to determine whether these trends in recovery persist across multiple years.

R263 Elephant Crop Heists in India

Alaina Wray

Veronica Yovov

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As elephant habitat is fragmented and human populations grow in India, human-elephant conflicts over elephants' crop raiding have risen. This has led to a complex challenge for land managers, farming communities, and elephant conservation. This poster will aim to explore this conflict, focusing on different stakeholders, causes, and solutions. These stakeholders include farmers, village members, India's government, India's Forest Department, conservation groups, and poachers. Causes include the growing human population, fragmented habitat, loss of habitat, poor infrastructure to protect farms, and the low-cost vs benefit for elephants to eat crops. This poster will ultimately aim to discuss management solutions that keep the elephants out of farms with a technique that raises the safety of the farming community, does not harm the elephants, protects crops, is cost-effective, and is long-term.

R278 Brook Trout Population Connectivity and Gene Flow Post Wildfire

Audre Young-Huggins

Yoichiro Kanno

Warner College of Natural Resources

Research Poster

This study explores Brook Trout (*Salvelinus fontinalis*) genetic flow in Little Beaver Creek, a tributary of the South Fork of the Poudre River that sections of were burnt in the Cameron Peak Wildfire in 2020. We were interested in understanding how the wildfire disturbance would impact the gene flow of Brook Trout especially with the increase of wildfire severity in the American West. Anal fin clips from Brook Trout were collected at 3 sampling sites along a 7-kilometer section of Little Beaver Creek. To investigate genetic structure across our sampling sites, Brook Trout were genotyped at 12 neutral microsatellite loci using polymerase chain reaction (PCR) and capillary electrophoresis. Using STRUCTURE and R Studio we analyzed how the population was structured between the three sites to investigate whether the sites experienced enough gene-flow to allow for recolonization after the wildfire. At the 7-kilometer spatial scale that there was enough connectivity for the population to recolonize even after wildfire may have eradicated a local population in the areas it burned. A slight genetic signature at the uppermost site was detected through the STRUCTURE and DAPC analyses. The slight increased amount in genetic diversity at the lower sites indicates that more migrants are received because they are closer to tributaries, allowing for more genetic diversity. Lower diversity in upstream areas may indicate that they are harder to recolonize making them more

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vulnerable to disturbances, whereas locations downstream may be more easily recolonized by tributaries making them more resilient.