

2017 Graduate Student Showcase

Abstracts

Heather Nicole Ewer

Selection from Band of Misfits : a marching band musical

2017 Fall - Music, Theatre and Dance

Band of Misfits is a musical about Mountain Peak High School's band camp. Mr. Corno created a giant schism in the band when he selected Tim to be the front field drum major instead of the more qualified and energetic Chelsea, the newly appointed backfield drum major. Now freshman oboist Lenny (who is forced to play baritone) is campaigning to get Chelsea where she rightfully belongs- on the podium at the front of the field. Today you will hear the song "Backfield Drum Major"- Lenny's confession of love to Chelsea, who does not know that he exists.

Project type: Performing Arts

Emma Catherine Hyché

The final girl : poetry and the horror genre

2017 Fall - English

Like poetry itself, horror tends to be a niche genre, inspiring internal devotion among its faithful, but remaining largely subcultural to the general population. In my poetry series "The Final Girl," inspired by a summer viewing horror movies, I investigate the permeation of horror tropes, including dread both physical and existential, gendered violence, and the slippery dichotomy of victimization versus empowerment, into everyday life through poetry. The poems of this series expose the horror in the undercurrents of American culture using a wide variety of poetic speakers, viewpoints, techniques, and tones.

Project type: Performing Arts

Katherine Grace Indermaur

"This Land Open" : a poetic exploration of Wyoming's environmental history

2017 Fall - English

This selection of original poems explores the history of human interaction with specific species of flora or fauna native to Wyoming. Behind the composition of each poem is significant academic research into the species' history and significance to humans. "This Land Open" demonstrates what academic research can bring to poetry and what a poetic approach can bring to scholarly work in history. Future options for the project include composing additional poems regarding more Wyoming wildlife and assembling these separate poems into a coherent collection, perhaps including prose to help contextualize the research behind each poem.

Project type: Performing Arts

Sam Lynn Killmeyer

Daughter

2017 Fall - English

This collection of poetry explores the relationship between Mothers and Daughters both in particular, personal relationships and in larger social expectations of women in American culture. The poems explore what it means to move from girl to woman; various types and forms of inheritance; and the expectations and violences enacted against female bodies.

Project type: Performing Arts

Michelle E. LaCrosse

Excerpt thesis reading - Sailing

2017 Fall - English

Creative Nonfiction essay with two main subject threads. The narrator recounts the experience of learning to sail and explains the significance of this event.

Project type: Performing Arts

David James Mucklow
Still, the West
2017 Fall - English

These poems work to consider the complexity of place of the American West, in attention to my own personal connections, its expansive landscape, condensed observation and image, geologic history of its formation, close history of homesteading, agricultural and extractive work, its rivers, trees, and grasses. The poems challenge how to speak about the West, to the West, and from a Western place.

Project type: Performing Arts

Zach Evan Yanowitz
Unlimited
2017 Fall - English

UNLIMITED is about possibility and potential, choices made/not made, and alternate lineations of self. These poems are an attempt to dig into this idea of separate selves under the assumption that each iteration is valid and deserving of attention despite its improbability/intangibility.

Project type: Performing Arts

001 - Lauren Faherty
Using Digital Fabrication to Rethink the Ways of Creating Form
2017 Fall - Art and Art History

Digital Fabrication technology is shaping the ways in which many artists are interacting with materials in the production of three-dimensional objects. Using Rhinoceros, a CAD program commonly associated with the applied use in 3D printing and CNC Milling Machines I am creating and designing ceramic tiles. By milling plaster molds with the CNC machine, I am then able to use these precise molds in the construction of ceramic tiles. By combining technology driven fabrication with a hands-on building process I am able to redesign the way we see ceramics and the form it can take.

Project type: Visual Arts

002 - Alexandra Forsythe
Human Hair as an Artistic Material
2017 Fall - Art and Art History

I am exploring the cultural significance of metals and adornment in conjunction with human hair. The main theme that has arisen to link the works in this series, due to the process of creation and the nature of the materials, have been concepts about time and my perception of it. My research will culminate with the creation of a collaborative work, including hair donated by students, which I intend to act a representation of the diverse nature of our CSU community.

Project type: Visual Arts

003 - Adam Jones
Icons
2017 Fall - Art and Art History

The body of work is inspired by masculine culture. I derive the imagery through stories and observations I have made. Being a male I have participated in "locker room" banter, and have been raised in a world where the traits of strength, cynicism, athleticism, and stoicism define expectations of masculinity. Through the use of sardonic and sarcastic "icons," I have created a body of work dealing with the absurdity of these notions and challenge these traits.

Project type: Visual Arts

004 - Christy Nelson

The Art of Repair

2017 Fall - Art and Art History

I am currently exploring the visual and philosophical connection my work makes to the Japanese process of kintsukuroi. Kintsukuroi uses lacquer combined with powdered gold, silver or platinum to repair chipped or broken ceramics. As a philosophy, Kintsukuroi sees brokenness as a place for added value, not diminishing worth. I believe my work offers a visual access point to this concept as it relates to violence against individuals that leaves them titled "victim". I hope it provides insight into scars, strength, and the beauty of healing.

Project type: Visual Arts

005 - Kyle Singer

An Act of Cathartic Expression that Abreact Trauma Through Sublimation

2017 Fall - Art and Art History

I highlight the importance of flaws, trauma, and repression by evoking concepts of "the unconscious" through surrealist methodologies. Considering all that is suppressed/repressed within my psyche to form the culturally accepted version of myself, and by examining the distance between my identity, and the repressed self. Engaging the viewers through superabundance, tackling issues of consumerism with construction that grapples with the excess of daily life. I question aesthetic value, moral responsibility, and political agency in my efforts to sublimate the abject. The abject touches on the fragility of our boundaries and the spatial distinction between our interiority and exteriority.

Project type: Visual Arts

006 - Emily Sullivan

Exposing the Super-Local

2017 Fall - Art and Art History

My highly-rendered graphite drawings explore our experience of the 'super-local.' Inspired by author Lucy Lippard, this idea manifests as the courtyard outside my campus studio. Despite its lack of conventional beauty, especially in competition with the Foothills and Rockies, it is the place I know best in Colorado. The plants that call this courtyard home, an often undervalued grassy courtyard sandwiched between two academic buildings, are elevated on substantial, elegant paper. This project exposes the location of our lives, the worlds with which we are all familiar, and urges viewers to consider their own 'local.'

Project type: Visual Arts

007 - Haroon Abasy

Investing on Dry Fruits & Job Creation

2017 Fall - College of Business

Afghanistan is an agriculture country, and grape is one of its main products. With a small investment on grape gardens to produce clean and packed raisin, not only that the investment is profitable, it will also create jobs for people and enables farmers to sell their grapes at a fair price. This will also increase the raisin export, which will lead to a better economy. Therefore, this is the summary of a raisin cleaning business model in Afghanistan, that will purchase directly the grape gardens from farmers, turn them into raisin, and will produce small packages of clean raisin.

Project type: Research, Scholarship, and Entrepreneurship

008 - Ali Abbas

Twisted and Coiled Sensor for Shape Estimation of Soft Robots

2017 Fall - Mechanical Engineering

Soft robots with inherent compliance have been recently investigated intensively for locomotion or manipulations. A critical problem for soft robots is the capability to estimate their shapes to enable closed-loop control for precise motion. In this paper, we propose a new low-cost sensor that can be leveraged for shape estimation of soft robots. This sensor, recently discovered as an artificial muscle, can be conveniently fabricated from low-cost conductive sewing threads. We recently found that the resistance will increase if the fabricated sensor is elongated due to an external force.

Project type: Research, Scholarship, and Entrepreneurship

009 - Farshad (Fred) Abdollah Nia

Higher-Order Fluorescence Correlation Spectroscopy

2017 Fall - Physics

I will introduce the basics of fluorescence correlation spectroscopy (FCS), a powerful tool in the time-resolved analysis of non-reacting or reacting molecules in solution based on fluorescence intensity fluctuations. I will explain how conventional FCS alone is insufficient to measure all parameters needed to describe a reaction or mixture. We have developed new techniques to compute higher-order correlations which provide the necessary information for full description of the studied molecular reactions.

Project type: Research, Scholarship, and Entrepreneurship

010 - Bahareh Abdollahipoor

Blending Effects of Hydrous and Anhydrous Ethanol on Gasoline Properties

2017 Fall - Mechanical Engineering

Bio-ethanol obtained from fermentation contains water and cannot be separated with distillation at the azeotrope point (96 vol. % ethanol and 4 vol. % water). Further water removal needs expensive methods. Thus, hydrous ethanol at the azeotrope point can be used to reduce the cost. In this effort, blends of gasoline with 10%, 15% and 30% by volume of anhydrous and hydrous ethanol were studied. In order to compare effect of anhydrous and hydrous ethanol on gasoline properties, parameters such as distillation curve, vapor pressure, etc., were measured. Negligible differences in properties between anhydrous and hydrous blends were seen.

Project type: Research, Scholarship, and Entrepreneurship

011 - Evan Robert Acerbo

The Effects of Sulforaphane on Nitric Oxide Induced Mitochondrial Dysfunction

2017 Fall - Environmental and Radiological Health Sciences

Sulforaphane (SFN) is an active compound found within many cruciferous vegetables such as broccoli and kale. SFN has previously been shown to have chemotherapeutic and chemopreventive activity. However, more recently, SFN has demonstrated both a novel ability to alter mitochondrial dynamics and consequently to protect damaged mitochondria. This ability of SFN may be of great interest in research of aging as current accepted theories of aging and the progression of age related diseases involve mitochondrial dysfunction as a key factor. My research investigates the potential of SFN as a protective agent against nitric oxide induced mitochondrial dysfunction.

Project type: Research, Scholarship, and Entrepreneurship

012 - Diane Charlot Aceveda

Protein Engineering Your Way to Potent and Selective Biologics

2017 Fall - Chemistry

Traditionally, therapeutic discovery has focused on small organic molecules (MW <800 Da) that target disease-relevant proteins. However, most proteins are deemed 'undruggable' because they lack largely hydrophobic small molecule binding sites. My research has focused on two projects, which aim to move beyond the 'small molecule - protein targeting' paradigm in therapeutic discovery. In my first project, I used mutagenesis and yeast display to optimize an RNA recognition motif (RRM) to specifically bind oncogenic microRNA-21. Additionally, I engineered chimeric proteins that will lead to a biologic that selectively and potently destroy HER2 positive breast cancer cells via antibody-dependent cellular cytotoxicity.

Project type: Research, Scholarship, and Entrepreneurship

013 - Sebastian Phillip Adams

Educational Psychology: Teacher-Student Rapport in the Secondary Music Ensemble

2017 Fall - Music, Theatre and Dance

Critical topics related to the evaluation of secondary music teachers continue to undergo philosophical evolution as perspectives are introduced by experts both in and out of the field. One concern is the role of the secondary music educator in the classroom and the potential impacts of teacher-student rapport on student learning. A synthesis of principles from four schools of educational psychology was made via a content analysis of seminal works to develop an understanding of teacher rapport dispositions. Data are presented to encourage discussion regarding pre-service teacher curriculum and teacher evaluation reformation.

Project type: Research, Scholarship, and Entrepreneurship

014 - Saeid Aghahosseini Shirazi

Development a Database for Alcohols as SI Engine Fuels

2017 Fall - Chemical and Biological Engineering

It is not possible to experimentally investigate the fuel potential of all of Alcohol molecules. The goal of this study was to use a systematic product design methodology to identify alcohol molecules that might be suitable for blending with gasoline. A detailed database was developed with 13 fuel properties of all of saturated normal, branched, and cyclic mono-alcohols (C1-C10). An initial decision framework for removing problematic compounds was devised and applied. Next, more stringent constraints were considered for two case studies of low and high (greater than 40 vol%) range blends of alcohol into gasoline for spark ignition engines.

Project type: Research, Scholarship, and Entrepreneurship

015 - Neha Harish Ahuja

Myocardial Afterload is a Key Regulator of Valve Development

2017 Fall - Cell and Molecular Biology

Congenital heart defects affect 2% of the population. It is becoming increasingly evident that perturbation of hemodynamics causes pathology. Here we present a zebrafish model in which we explore the impact of myocardial afterload on valve development. Myocardial afterload is defined as the resistance that the ventricle must overcome in order to successfully pump blood. Increased myocardial afterload causes an elongation of the valves, as well as increased expression of flow-responsive gene *klf2a*. Our results highlight myocardial afterload as an epigenetic regulator of valve development.

Project type: Research, Scholarship, and Entrepreneurship

016 - Taghreed Mohammed M. Al Turki
TERRA in the Telomeric DNA Damage Response
2017 Fall - Cell and Molecular Biology

The discovery of telomeric RNA (TElomere Repeat-containing RNA; TERRA) has introduced a new end player and prompted intense investigation. TERRA is a long noncoding RNA (lncRNA) shown to serve a structural role at telomeres, as well as function in regulation of telomere length and telomerase activity. Given the roles of TERRA in facilitating telomeric recombination and in preventing inappropriate telomeric damage responses, we hypothesized that TERRA may play a critical role in the repair of telomeric DNA damage by providing a template for telomeric recombination.
Project type: Research, Scholarship, and Entrepreneurship

017 - Yeva Aleksanyan
The Effect of War on Sex and Survival of Children
2017 Fall - Economics

How does war affect the birth and survival of children? I investigated the effect of World War II on the sex ratio among those born during and after the war in Russia. Difference-in-difference analyses show that being born during the war is associated with decreased sex ratio resulting on relatively higher proportion of female births and survival. Meanwhile, the areas that were directly affected by the horrors of war had slightly higher sex ratio than the rest of Russia, showing that in case of severe male scarcity, male children are valued more and have higher chance of survival.
Project type: Research, Scholarship, and Entrepreneurship

018 - Alyssa Jean Aligata
Effect of Cellular Composition on Acoustic Harvesting of Microalgae
2017 Fall - Mechanical Engineering

Significant technical challenges exist across the value chain of microalgae-based biofuels and bioproducts. Ultrasonically enhanced settling, or acoustic harvesting, is a technology that could dramatically reduce harvesting costs. Acoustic harvesting utilizes standing waves to create an acoustic radiation force, which causes the microalgae cells to agglomerate and settle out of the solution due to differences in the acoustic properties of the cells and media. Characterizing the cellular composition and acoustic properties of microalgae cells will lead to a better understanding of acoustic harvesting and help design a harvester that can meet the needs of large scale microalgae production.
Project type: Research, Scholarship, and Entrepreneurship

019 - Hanan Alqarni
Using Needs Analysis as a Tool for ESP Curriculum Alignment
2017 Fall - English

This poster will explore how needs analysis can be used to improve the alignment of post-secondary EAP curricula. The author will discuss her own needs analysis project, detailing her methods of data collection and analysis, and share how the findings were used to redesign the curriculum of an EAP course.
Project type: Research, Scholarship, and Entrepreneurship

020 - Radi Alsulami

The Role of Physical/Chemical Properties of Fuels on Flame Stability

2017 Fall - Mechanical Engineering

Liquid fuels have different physical and chemical properties which can affect the atomization, evaporation and mixing processes inside heat engines, such as a turbine engine. The relationship between the fuels properties (in particular the role of preferential evaporation in multicomponent fuels) and combustion/flame stability is investigated in this work. To achieve that, a spray burner was designed and manufactured to simulate turbine engine with capability of delivering high fuel and air co-flow rates and different air temperatures. The flame behavior and stability have been studied by measuring the flame liftoff height and blowout limits for different single and multi-component fuels.

Project type: Research, Scholarship, and Entrepreneurship

021 - Emily Kay Amedee

"More Than Your Major": A Call for a Transdisciplinary Curriculum

2017 Fall - Communication Studies

As the world continues to face progressively complex issues, siloed education rooted deeply in isolated disciplines is costly. To complement the progress CSU has made on transdisciplinary opportunities for researchers and faculty members, the One Health Club is currently developing a curriculum to prepare the next generation of One Health practitioners. The One Health Online Master's Certificate is intended to cultivate the necessary values and skills to engage in transdisciplinary work of this caliber. It affords our student body - future scholars, researchers, business owners, and change agents - an opportunity to further the impact of their disciplines and degrees.

Project type: Research, Scholarship, and Entrepreneurship

022 - Shelly Annameier

Community Based Type 2 Diabetes Prevention in Hispanic/Latino Adolescents

2017 Fall - Human Development and Family Studies

~50% of Hispanic/Latinos in the US will develop type 2 diabetes (T2D). Adolescent-onset T2D has an aggressive disease course, earlier mortality, and is a growing health concern. Standard lifestyle interventions have poor adherence and sustainability in adolescents at-risk for T2D. Psychosocial stressors and depressive symptoms may pose additional challenges for making lifestyle changes. There is a critical need for new approaches to preventing T2D in adolescents. Through a community-based participatory research program, "Boot Camp Translation," we examined evidence-based programs and cultivated culturally-tailored ideas for more effective prevention efforts, including launching focus groups to gather feedback for a comparative effectiveness trial.

Project type: Research, Scholarship, and Entrepreneurship

023 - Bethy A. Astella

Multiple Realities of Natural Resources

2017 Fall - Human Dimensions of Natural Resources

The approach taken in this study calls for a re-conceptualization of natural resources and how they are to be managed. We analyze the complexity conflict in a national park by loosening seemingly established ground of what natural resources are. We employed Actor Network Theory (ANT) inspired insight of 'multiple enactments' which indicates that natural resources are multiple objects depending on who, how and what methods are used in defining and performing them. We examined three enactments of natural resources: 'Livelihood', 'Industry' and 'Conservation'. The conceptualization of natural resources as having multiple versions sheds new light to natural resource management endeavors.

Project type: Research, Scholarship, and Entrepreneurship

024 - Broc Eldon Bainter

African Impact: Curriculum for Teaching English

2017 Fall - English

The purpose of this project is to develop an updated curriculum for an adult literacy course ran through a nonprofit organization in Livingstone, Zambia. A needs analysis on the target population was conducted to best accomplish this, including surveys, interviews, and observations. The results of the needs analysis helped to inform the development of the curriculum by showing where the students lacked in their English ability and what their needs as English learners were. Moving forward, revisions on the current curriculum will be made to best fit the needs of the learners.

Project type: Research, Scholarship, and Entrepreneurship

025 - Jessica Leigh Baker

Sustainable Transfer of Innovative Drinking Water Technology to South Africa

2017 Fall - Civil and Environmental Engineering

According to the UN, 10% of the world's population does not have access to safe water. History reveals that simply developing a technology does not ensure long-lasting impact; how a technology is transferred is critical to its sustainability. This requires the holistic consideration of politics, economics, environment, etc. The focus of this project was to share research conducted at CSU regarding cost effective modifications of chlorine contact tanks that improve the hydraulic disinfection efficiency, with Umgeni Water, a collaborative partner in South Africa. This was accomplished through a case study on a live system in rural community in South Africa.

Project type: Research, Scholarship, and Entrepreneurship

026 - Lydia R. Baldwin

Restoring Carbon Accumulating Processes in a Degraded Wet Meadow

2017 Fall - Ecology

Historically disturbed wet meadows throughout the Sierra Nevada are losing the ability to store carbon. While these wetlands formerly functioned as carbon dioxide sinks, they could now act as significant sources of CO₂. In 2016, 20,000 *Carex scopulorum* (mountain sedge) were planted into Tuolumne Meadows to test whether the reestablishment of a sedge dominated community will restore the wet meadow to a carbon accumulating ecosystem. Primary production and respiration were monitored to determine if these treatments increase the meadow's carbon storage. This restoration project will inform land managers facing similar issues of drying meadows with potentially large losses of CO₂.

Project type: Research, Scholarship, and Entrepreneurship

027 - Carla Mayzie Bamesberger

Evidence of Reading Comprehension Strategies in Adult and Non-Adult-Oriented Cartoons

2017 Fall - Journalism and Media Communication

The purpose of this analysis is to consider the frequency of reading comprehension strategies applied in adult-oriented and non-adult oriented cartoons. This study samples twelve cartoons (six adult-oriented and six non-adult-oriented) to assess occurrences of making inferences, character motivations and relationships, and main ideas and supporting details. The outcome will suggest whether or not cartoons can serve as major texts in educational settings with an emphasis on developing reading comprehension skills. Cartoons are a popular media among adults and children, and utilizing them for education may be widely beneficial for learners.

Project type: Research, Scholarship, and Entrepreneurship

028 - Giovana Batista

Urban Water Demand Characterization in Sao Paulo, Brazil, Using IUWM

2017 Fall - Civil and Environmental Engineering

Urban sprawl over the past decades have put water resources under pressure in urban areas due to constantly increasing demand and impaired quality. Particularly in developing countries, investments in this sector are still scarce. The application of the Integrated Urban Water Model - IUWM - for the characterization of current and future urban water demand in the municipality of Sao Paulo, Brazil, is pioneering in applying the model outside of the United States. The model also evaluates water conservation scenarios, cost saving options and can be of use for water utilities and urban planners.

Project type: Research, Scholarship, and Entrepreneurship

029 - Micah Lee Battson

The Obese Gut Microbiome Promotes Arterial Stiffening in Lean Mice

2017 Fall - Food Science and Human Nutrition

Vascular dysfunction represents a crucial link between obesity and cardiovascular disease, although the mechanisms underlying the development of vascular dysfunction in obese individuals are unclear.

Recent work in our laboratory suggests that deleterious changes in the composition of the gut microbiota, termed dysbiosis, promotes vascular dysfunction in Western diet-fed mice. To extend these findings, the current studies used microbiome transplants between lean and obese mice to test the hypotheses that 1) intestinal dysbiosis is a causal factor in the development of obesity-related vascular dysfunction and 2) vascular function can be improved in obese mice by restoring a healthy microbiome.

Project type: Research, Scholarship, and Entrepreneurship

030 - Braden D. Beckstrom

Life-Cycle and Techno-Economic Harmonization of Reported Algal Biofuel Process Results

2017 Fall - Mechanical Engineering

The large range of reported values of life-cycle assessments (LCA) and techno-economic assessments (TEA) in the algal biofuels research sector is concerning. The wide range of reported results cause problems when trying to directly compare processes across papers. Our project is an attempt to rectify this concern by unifying the diverse methods of reporting results in this sector. A harmonization of standard assumptions such as growth rate and system boundaries was completed on over 20 journal articles. This harmonization effort helps us compare papers directly and assess which production pathways have the most future potential.

Project type: Research, Scholarship, and Entrepreneurship

031 - Laura Janell Beese

Communal Music and Prosocial Skills in Children: Exploring the Connections

2017 Fall - Music, Theatre and Dance

Elementary music classes, in which singing games, group dance, and synchronous instrument playing are common, can be uniquely positioned to develop socioemotional skills. Akin to math and literacy, social skills - reading others' emotional states, managing emotions, developing empathy, and maintaining relationships - can be taught. Compelling research correlates group music making to the development of these prosocial skills in school-aged children. If general music specialists who work with young children understand how and why communal musical activities can impact socioemotional learning, it is possible that they can emphasize such activities to enhance cooperation and ensemble cohesion among students.

Project type: Research, Scholarship, and Entrepreneurship

032 - Aerial D. Belk

Microbial Clocks to Estimate the Postmortem Interval of Human Remains

2017 Fall - Animal Sciences

Estimating the postmortem interval (PMI) is crucial to forensic investigations. Many commonly used methods are not useful after ~48 hours, so others are currently being developed for long-term PMI estimation. The purpose of this study was to generate a microbial clock using 16S sequencing that can predictably map the progression of the PMI and to determine if this clock moves similarly in different geographical regions. A Random Forest classifier was used to train and test models using different subsets of the data. Models were compared based on the RMSE, and results show the most effective models to predict the PMI.

Project type: Research, Scholarship, and Entrepreneurship

033 - Amina Benkamla

History, Identity, Memory: Khadra's What the Day Owes the Night

2017 Fall - Languages, Literatures and Cultures

This project is based on historical research and detailed literary analysis. The goal is to demonstrate how Yasmina Khadra's novel represents a specific historical period thanks to a fictional narrative. It is essentially based on the concepts of identity and memory reflected in French colonial Algeria before and during the Algerian war (1954-1962). Through these two concepts, Khadra's work reflects the different perspectives of the Franco-Algerian difficult past as it tries to reconcile these two nations.

Project type: Research, Scholarship, and Entrepreneurship

034 - Samiha A. Mohamd Benrabaa

Transcriptomics of Halloween and Ecdysone-Responsive Gene Expression in *Gecarcinus lateralis*

2017 Fall - Biology

Molting is necessary for growth and development in all arthropods. Halloween genes are expressed in the molting gland (Y-organ) and encode enzymes that catalyze the synthesis of ecdysteroid hormones. Transcriptomics was used to quantify gene expression. The MLA transcriptome, relative mRNA levels of Halloween genes were highest in intermolt and early premolt and then decreased during mid and late premolt to their lowest levels 10 days postmolt. ESA/Rapamycin transcriptome showed that Halloween genes and ecdysone-responsive genes levels were not significantly different from control groups and experiment groups except HR4, which showed a transient increase at 1 day post-ESA.

Project type: Research, Scholarship, and Entrepreneurship

035 - Stefanie Alexandra Berganini

North Fort Collins: Social Services at the Urban Frontier

2017 Fall - Anthropology

Many of Fort Collins' social services - food banks, homeless shelters, and public health centers - are located in North Fort Collins, in areas previously removed from the city's major population center. Now, due to the city's rapid growth, these areas are becoming urbanized, with higher-density development encroaching on existing social service locations. This new dynamic raises questions about whether Fort Collins' social services have - due to either economic or social forces - felt pressure to relocate even farther from the city center. This research combines GIS data mapping and qualitative interview analysis to provide insight into these issues.

Project type: Research, Scholarship, and Entrepreneurship

036 - Richard E. Berl

Stories of Prestige, Creation, and the Evolution of Culture

2017 Fall - Human Dimensions of Natural Resources

Every human on our planet belongs to a culture, and we all begin to learn this information very early in life. But to accomplish this, we each have some very important decisions to make: What do we learn and who do we learn it from? And what do we do when these signals compete for our attention? To answer this, we used speakers of high and low prestige and two artificially constructed creation stories to test what information people use. Our findings may upturn our understanding of how humans learn and behave, and how our extraordinary capacity for culture evolved.

Project type: Research, Scholarship, and Entrepreneurship

037 - Deniz Besiktepe Karaman

MCDM Model for Repair & Replacement Decisions of Condition Based Building Maintenance

2017 Fall - Civil and Environmental Engineering

Building maintenance is a significant part of Facilities Management which is necessary to sustain the expected performance of the built environment. Different issues such as lack of funding and insufficient resources, increase the impact of decisions in the maintenance process. The main purpose of this study is to generate a decision making model for the effective repair and replacement decisions of building maintenance with a condition assessment support framework and Multi Criteria Decision Making. The expected impact of the study is to analyze the benefits of repair and replacement decisions with the proposed model compared to decisions given without model.

Project type: Research, Scholarship, and Entrepreneurship

038 - Harmonie Marie Bettenhausen

Metabolomic Analysis on Impact of Barley Variety on Beer Flavor

2017 Fall - Food Science and Human Nutrition

Recent studies demonstrate that barley varieties contain major differences in the chemical content of the grain. The goal of this study is to determine if variation in grain chemistry influences beer flavor. We applied metabolomics of barley grain, malt, and beer for six barley varieties, and performed sensory analysis of the different malts and beers. The analyses revealed significant chemical variation in the barley, malt and beer, and beers could be discriminated by sensory evaluation. A statistical model was used to integrate the chemical and sensory data to identify grain metabolites that can be targets to breed barley for flavor.

Project type: Research, Scholarship, and Entrepreneurship

039 - Tom Edward Bickett

BCG and Innate Immunity

2017 Fall - Microbiology, Immunology, and Pathology

For almost a century the Bacillus Calmette-Guérin (BCG) vaccine has been used to protect against Mycobacterium tuberculosis infection, and today 157 countries still universally recommend it. Despite these efforts, M. tuberculosis currently infects one-third of the world's population and is responsible for millions of deaths annually. BCG Vaccine efficacy varies widely and protection wanes over time, but little is understood about its poor success rate. This study focuses on early immune responses shortly after BCG vaccination to understand the mechanisms through which BCG establishes protection and, eventually, could lead to the development of a more effective alternative.

Project type: Research, Scholarship, and Entrepreneurship

040 - Tyler James Biebighauser

Dynein at the Kinetochore

2017 Fall - Biochemistry and Molecular Biology

Dynein is a large molecular complex that facilitates the movement of molecules in a cell. When a cell divides, Dynein will strip off proteins located at the kinetochore, which is an area on a chromosome where microtubules will bind to separate sister chromatids during anaphase. This stripping serves as a signal to the cell to progress into anaphase. Errors in the regulation of anaphase onset have been strongly linked to cancer, so further study of Dynein mediated stripping should shed light on potential mechanisms of oncogenesis.

Project type: Research, Scholarship, and Entrepreneurship

041 - Kelsey R. Bilback

Household Cookstoves: A Comprehensive Assessment of Health-Relevant Emissions

2017 Fall - Mechanical Engineering

Air pollution from biomass and liquid-fuel cookstoves is estimated to lead to 3.5 million deaths annually. Cookstove emissions are composed of thousands of gas and particle phase pollutants that are known to impact human-health; however, most cookstove studies only measure total particulate matter (PM) and carbon monoxide (CO). The aim of our study was to develop a comprehensive inventory of cookstove pollutants and assess whether PM and CO are markers of other harmful emissions. Insight from this work could help optimize field measurements and improve our understanding of the health-impacts of various cookstove technologies.

Project type: Research, Scholarship, and Entrepreneurship

042 - Terrance T. Bishop

Visualizing the Cytoskeleton Architecture of Mammalian Sperm Flagella

2017 Fall - Biomedical Engineering

The organization and mechanical properties of many cell types can be related to their cytoskeleton architecture. Mammalian sperm is composed of a head that stores DNA and a flagellum that propels the cell. The flagellum is composed of three sections: midpiece, principal piece, and end piece. However, the structure of the cytoskeleton still remains unknown. We succeeded in visualizing the structure of actin and actin-associated proteins in the cell, additionally, atomic force microscopy was used to resolve the surface topology of the cell. It was found that the mid-piece of murine sperm develops a cytoskeleton with a sinistral double-helix pattern.

Project type: Research, Scholarship, and Entrepreneurship

043 - Hayley Eve Blackburn

Hair Politics for Black Women in the Fictional Workplace

2017 Fall - Journalism and Media Communication

I examine the framing of natural (Afrocentric) hair on Black women in four case studies of scripted television programs: *Being Mary Jane*, *Empire*, *Sleepy Hollow*, and *How to Get Away with Murder*. Through a visual analysis, I find natural hair consistently defines the "Black savage," which stands in opposition of desirable Eurocentric phenotypes; the Black woman with altered hair represents a civilized, thus successful, Black body. Overall, audiences are invited to view natural hair in a very limited capacity within the professional sphere, and the framing reinforces the savage/civilized construction for non-white bodies.

Project type: Research, Scholarship, and Entrepreneurship

044 - Sara Petrita Bombaci

New Zealand's Eco-Sanctuaries Restore Native Bird Diversity and Seed Dispersal

2017 Fall - Ecology

Many birds on islands are threatened by invasive mammal predators. In New Zealand, conservation organizations have constructed a network of 'eco-sanctuaries,' which exclude invasive mammals with predator-proof fencing and provide opportunities to conserve native birds. We assessed the effectiveness of eco-sanctuaries for restoring bird communities and bird-mediated seed dispersal. We compared the density and diversity of birds, foraging rates, and the densities of bird-dispersed seeds between mammal-free sanctuaries and paired unprotected sites. We found 0.5-4.0 times higher densities of native bird species, higher bird diversity, higher foraging rates, and higher densities of bird-dispersed seeds in sanctuaries compared to unprotected sites.

Project type: Research, Scholarship, and Entrepreneurship

045 - Amy Elizabeth Boncella

Effects of Aggregation-Promoting Mutations on Stress Granule Dynamics

2017 Fall - Chemistry

Mutations in a number of stress granule-associated proteins have been linked to various neurodegenerative diseases. Several of these mutations are found in aggregation-prone intrinsically disordered domains (IDRs) of these proteins. My studies have focused on two IDR-containing yeast stress granule proteins, Pab1 and Pbp1. I have introduced mutations designed to enhance aggregation of these proteins and observed effects on stress granule dynamics. Results suggest that these mutations affect IDR localization in the context of overexpression, but do not affect stress granule dynamics in an endogenous system. This has led to questions about how the proteostasis machinery affects stress granule dynamics.

Project type: Research, Scholarship, and Entrepreneurship

046 - Tyler Nathaniel Boone

Visualizing Neutrino Interactions in the ICARUS Liquid Argon TPC

2017 Fall - Physics

The ICARUS liquid argon time-projection chamber detector (LArTPC) is the largest such device to operate in a neutrino beam and will be one of three LArTPCs that will make measurements simultaneously at the Short Baseline Neutrino (SBN) program at the Fermi National Accelerator Laboratory. Simulation and visualization of neutrino interactions in the detector are essential tools for data analysis. We present an overview of the basic principles of a LArTPC, using the software package LArSoft developed at Fermilab, and contrasting the simulated response of the detector to high energy electrons, muons, pions, and protons that are produced in neutrino interactions.

Project type: Research, Scholarship, and Entrepreneurship

047 - Andrea Deborah Booth-Kalajian

Subcutaneous Fat: A Protector from Metabolic Dysregulation

2017 Fall - Food Science and Human Nutrition

Lower body subcutaneous adipose tissue (LSAT) is proposed to be a protective fat depot functioning as a "metabolic sink" for excess lipid accumulation. We have previously demonstrated that removal of this LSAT in high fat diet (HFD) mice resulted in increased muscle triglycerides and was associated with decreased glucose tolerance. In the present study we removed varying amounts of SAT to comprehensively investigate mechanisms of the "metabolic sink" concept. Overall, accumulative fat removal worsens muscle insulin sensitivity and glucose tolerance. This decline may be related to lipid intermediates contained within the muscle.

Project type: Research, Scholarship, and Entrepreneurship

048 - Mark E. Bourgeois

Characterizing an Out of Build Plane Continuous Fiber 3D-Printing System

2017 Fall - Mechanical Engineering

In traditional continuous fiber reinforced composite laminate manufacturing, complex geometries can introduce large tooling costs and long layup times, increasing the time from concept to product realization. 3D printing approaches, specifically the use of extruders common to fused deposition modeling (FDM), have been shown to offer a potential solution but the placement of continuous fiber in this fashion has been limited to research-scale manufacturing in a layer wise fashion. To overcome the limitations that led to planar, layer wise direct manufactured continuous fiber reinforced composites, and increase design flexibility, a 5-axis continuous fiber capable additive manufacturing system has been developed.

Project type: Research, Scholarship, and Entrepreneurship

049 - Matt Robert Bowers

Synaptotagmin's C2A Domain: No Longer Playing Second Fiddle

2017 Fall - Biomedical Sciences

In order to function properly, the nervous system requires that signals be transmitted accurately between neurons via synaptic transmission. The calcium-binding protein synaptotagmin is critical to this synaptic transmission. Membrane interactions mediated by the calcium-sensing domains of synaptotagmin, C2A and C2B, couple Ca^{2+} influx to neurotransmitter release. However, the relative importance of the two domains has been controversial. Previous experiments have suggested that C2B is the primary functional domain, with C2A only playing a facilitating role. Using point mutagenesis and electrophysiological recording, we have found that C2A plays a much more active role in synaptic transmission than previously understood.

Project type: Research, Scholarship, and Entrepreneurship

050 - Amanda Jo Broad Investigating

Aurora B Kinase Activity at Kinetochores during Cell Division

2017 Fall - Biochemistry and Molecular Biology

Mitotic cell division is a fundamental biological process that is essential for all eukaryotes to divide the replicated genome with high fidelity into individual daughter cells. Improper segregation of replicated DNA results in chromosome instability, a characteristic that is deleterious to most cells. Critical to the proper segregation of mitotic chromosomes is attachment to spindle microtubules. A complex network of proteins, collectively called the kinetochore, mediates microtubule attachments to chromosomes. KMT interactions are regulated by the mitotic kinase Aurora B (ABK). We set out to determine the contribution of phospho-histone marks to the recruitment and activity of ABK at kinetochores.

Project type: Research, Scholarship, and Entrepreneurship

051 - Colin Patrick Brook

Influence of Perfluoroalkylated Fullerenes on Photodegradation of Organic Photovoltaics

2017 Fall - Chemistry

In this work, we seek to improve the long term stability of organic photovoltaic (OPV) active layers using perfluoroalkylfullerene acceptors. The rates of irreversible photobleaching of blends of donor polymers and fullerene acceptors were found to correlate well with the electron affinity of the fullerene, provided that the polymer and fullerene were well blended. The degree of blending was quantified in terms of domain size using scanning tunneling microscopy imaging. We observed, for example, that $C60(CF_3)_2$ had a pronounced effect on stabilizing the donor polymer towards photodegradation if that donor polymer contained fluorinated benzothiadiazole groups that promote miscibility.

Project type: Research, Scholarship, and Entrepreneurship

052 - AJ Joseph Brown

Soil Salinity Measurement and Effects on Corn in Southeast Colorado

2017 Fall - Soil and Crop Sciences

Global salinization of irrigated lands results in a \$12 billion (US) reduction in global crop production annually. A joint effort between Utah State University, Colorado State University, and Mehran University in Pakistan aimed to investigate the impacts and movement of salts in agronomic systems, and identify common solutions. This was done through water and soil monitoring in Southeast Colorado in a surface irrigation setting. Results indicated that salts are loaded onto fields because of saline water, and get trapped in root zones by shallow water tables. The added salt decreases osmotic potential in soil, making root water uptake more difficult.

Project type: Research, Scholarship, and Entrepreneurship

053 - Ashley Marie Budde

The Effects of Zinc and Chromium Supplementation in Feedlot Cattle

2017 Fall - Animal Sciences

The effects of Zn source and dose and Cr supplementation on performance and carcass characteristics of feedlot steers were evaluated using a randomized complete block design. Four-hundred steers were blocked by weight, with five treatments. Steers receiving 90Zl+Cr tended to have greater final BW and ADG in steers receiving 90Zl. Hot carcass weight was greater for 90Zl+Cr compared to 90Zl. Under the conditions of this experiment, Zn source and dose had no impact on response variables measured but Cr addition to diets supplemented with 90 mg Zn/kg DM tended to improve final BW, ADG, and hot carcass weights.

Project type: Research, Scholarship, and Entrepreneurship

054 - Jennifer Bukowski

Simulating Middle Eastern Dust Storms: Uncertainty in Weather Forecast Models

2017 Fall - Atmospheric Science

The prediction of dust storms remains a significant weather and air quality forecasting challenge. Operational weather models can simulate large scale weather, but cannot explicitly resolve smaller scale systems such as thunderstorms. Statistical simplifications, known as parameterizations, are employed to represent these phenomena, which can loft copious amounts of dust to the atmosphere. Forecast uncertainty is introduced with parameterizations, and this study seeks to quantify the amount of airborne dust misrepresented by coarse weather models by performing high resolution simulations of a Middle Eastern dust event. Results show that storm-scale dust lofting is a substantial aerosol source neglected in forecasts.

Project type: Research, Scholarship, and Entrepreneurship

055 - Molly Dean Butler

Novel Retrovirus Associated with Thymic Lymphoma in Gunnison's Prairie Dogs

2017 Fall - Microbiology, Immunology, and Pathology

We report thymic tumors found in three Gunnison's prairie dogs and associated, novel retroviral sequence identified from spleen and tumor samples. We used degenerate, retroviral primers (LVDTGA, VLPQG, and YMDD) and saw positive amplification in tissue samples from animals with visible tumors. NextGen sequencing was performed and data analysis yielded approximately seven kb of sequence with a complete open reading frame which encodes capsid, polymerase and envelope genes, gag, pro-pol, and env. This sequence was only identified in tumor-positive prairie dog tissue samples. Further studies are indicated to extend the known sequence and to screen additional prairie dogs.

Project type: Research, Scholarship, and Entrepreneurship

056 - Matthew David Cackovic

Droplet Manipulation on a Surface Using the Triboelectric Effect

2017 Fall - Chemical and Biological Engineering

Triboelectrification is the phenomena that two surfaces acquire charges of opposite signs through contact-induced surface charging. The triboelectric series (i.e., a list of materials ranked on their tendency to become positively or negatively charged) interestingly do not contain any liquid, even though the contact electrification of liquids with both high (e.g., water) and low (e.g., n-hexadecane) dielectric constants after they contact a solid surface has been observed. In this work, for the first time, we demonstrate the controlled manipulation of liquid droplet with both high (e.g., water) and low (e.g., n-hexadecane) dielectric strengths on a slippery surface via triboelectric effect.

Project type: Research, Scholarship, and Entrepreneurship

057 - Maria Cristina Capurro

Measuring Crop Water Use with a Novel Internet-of-Things Sap-Flow System

2017 Fall - Soil and Crop Sciences

Most of the world's water is used to irrigate crops. For long term agricultural sustainability, it is crucial to improve irrigation efficiency. Assessing crop water consumption using sap flow gauges can aid to find this path. This study shows a new type of sensor to measure sap flow through the plant stem. These do-it-yourself gauges were made using a 3D printer and low-cost open-source electronics. Data is instantly sent using Internet of Things (IoT) technology and can be seeing in real time from any device. Results will improve our ability to predict crop water use and better manage water resources.

Project type: Research, Scholarship, and Entrepreneurship

058 - Amanda R. Carlson

Disturbance, Climate, and Regeneration in a Rocky Mountain Forest

2017 Fall - Ecology

We aim to assess impacts of disturbances on regeneration potential and climate change exposure of a Rocky Mountain forest which has been severely affected by a spruce beetle outbreak and wildfire. Our field study included measurements of continuous below-canopy temperature measurements using Logtag[®] sensors, soil moisture, seed dispersal counts using mesh seed traps, seedling counts, and live/dead basal area of standing trees. We will use this data to quantify differences in the micro-environments and seed dispersal rate of regenerating forests resulting from disturbance-related canopy loss, and to determine impacts of these changes on seedling regeneration densities.

Project type: Research, Scholarship, and Entrepreneurship

059 - Ivan Caro Terrazas

Tomographic Particle Interaction Event Reconstruction in MicroBooNE

2017 Fall - Physics

We explore the use of tomographic imaging techniques in liquid argon time projection chambers to study neutrino event reconstruction using data from the Micro Booster Neutrino Experiment (MicroBooNE) located at Fermi National Accelerator Laboratory.

Project type: Research, Scholarship, and Entrepreneurship

060 - Kasimir Floyd Carranza

Stem Cell Analysis of Fresh and Frozen Human Breast Milk

2017 Fall - Environmental and Radiological Health Sciences

Pumping breast milk and freezing it is common practice in hospitals, neonatal intensive care units (NICU), and numerous households. Freezing milk may alter the cellular constituency of breast milk by reducing the amount of stem cells. Here, we investigate the alteration of stem cell viability and concentration in human breast milk frozen at varying temperatures and durations. This reduction may negatively impact infant development; vulnerable populations such as preterm infants have higher nutritional requirements and less volumetric capacity in their stomach. Freezing milk may undermine attempts to supply preterm infants with the nutritional requirements needed to sustain life.

Project type: Research, Scholarship, and Entrepreneurship

061 - Cody S. Carrell

3D-Printed Rotational Manifold for Rapid Colorimetric Salmonella Detection

2017 Fall - Chemistry

In the United States, Salmonella is responsible for more hospitalizations and deaths per year than any other pathogen. In this project we developed a Salmonella assay utilizing immuno-magnetic separation (IMS) on a paper-based analytical device (PAD). To our knowledge, this is the first instance of IMS demonstrated in paper. To ensure our Salmonella assay could be used in resource limited settings, our test is performed with a re-usable 3D printed manifold and disposable reagent inserts. The manifold is designed to streamline the assay for minimized end-user training and rapid results.

Project type: Research, Scholarship, and Entrepreneurship

062 - Natalia Infante Caylor

Influence of EFNEP on the Quality of Life of Educators

2017 Fall - Education

To determine the influence of the Expanded Food and Nutrition Education Program (EFNEP), on the quality of life (QoL) of its educators. Research is based on multi-state qualitative telephone interviews with 15 EFNEP supervisors, 28 EFNEP educators, and 15 agency partner representatives. Data collected from the phone interviews were transcribed and analyzed using template analysis based on the University of Toronto's QoL construct for adults. The EFNEP had a positive impact on 6 of 9 a priori categories: physical being, psychological being, social belonging, community belonging, practical becoming, and growth becoming.

Project type: Research, Scholarship, and Entrepreneurship

063 - Ting Cha

Eyewall Replacement Cycle of Hurricane Matthew Observed by Doppler Radar

2017 Fall - Atmospheric Science

Hurricane Matthew was observed by S-band polarimetric radars when it approached southeastern United States during an eyewall replacement cycle (ERC) event. The evolution of Matthew's ERC is documented by examining the axisymmetric primary and secondary circulations derived from the single Doppler radar observations, performing GBVTD technique to diagnose the vortex kinematic structure. A NOAA P-3 flight with airborne radar simultaneously observed the internal structure of Matthew during the period of secondary eyewall intensification (19Z October 6th to 00Z October 7th). These new datasets help provide new insights into the ERC process and hurricane intensity change.

Project type: Research, Scholarship, and Entrepreneurship

064 - Benjamin Eric Choat

Baseflow Response to Varying Spatial Arrangements of Stormwater Infiltration Facilities

2017 Fall - Civil and Environmental Engineering

Urban development negatively impacts receiving streams by altering natural flow regimes. Emphasis in stormwater management has been on peak flows, and only recently has the importance of managing baseflow (low flow) been acknowledged. This project aims to identify how spatial arrangements of stormwater management infiltration facilities affect baseflow in timing and magnitude. An integrated surface-subsurface finite difference numerical model, ParFlow, is being used for this research. This work will result in statements about how physical catchment characteristics affect baseflow response to infiltration facilities and will contribute to recommendations on the most appropriate spatial distributions of infiltration stormwater control measures.

Project type: Research, Scholarship, and Entrepreneurship

065 - Shannon Lee Clark

Comparing Herbicides for Residual Weed Control and Native Species Tolerance

2017 Fall - Bioagricultural Sciences and Pest Management

Downy brome (*Bromus tectorum* L.) is considered one of the most problematic invasive species in the western US. Dalmatian toadflax (*Linaria dalmatica* L.) is another invasive weed species found in dense populations in the west. A field trial was conducted to evaluate native species tolerance to 11 herbicide treatments commonly used for downy brome and Dalmatian toadflax control. Indaziflam treatments increased native species richness 8%, while providing 95-100% downy brome control. Picloram treatments reduced species richness 35%. These results suggest indaziflam could be a potential management option in restoration of natural areas impacted by downy brome and other invasive weeds.

Project type: Research, Scholarship, and Entrepreneurship

066 - Allison Cleymaet

Automated Versus Manual Refractive Error Measurements in Domestic Cats

2017 Fall - Clinical Sciences

Refractive error degrades visual acuity in the domestic cat, an important clinical and laboratory species. Refraction by streak retinoscopy (SR) requires advanced training and practice. Objective autorefraction, e.g. using the Welch Allyn SureSight™ (WASS) autorefractor, may offer a faster, more practical, and accurate method. We compared refraction as determined by SR and WASS using both adult and pediatric settings in 30 adult cats. While there was a significant difference between methods, the level of agreement between SR and WASS adult for measurement of refractive error in the adult cat is reasonable. For WASS, the adult setting is recommended for clinical use.

Project type: Research, Scholarship, and Entrepreneurship

067 - Susan C. Clotfelter

Game Changer: Evaluating Effects of the Video Game "Never Alone"

2017 Fall - Journalism and Media Communication

Can a video game create changes in self-concept and support resilience for Alaska Native youth? That was the purpose of the Cook Inlet Tribal Council when it created "Never Alone," an award-winning puzzle-platform game based on the rich storytelling culture of the Iñupiaq people. This research proposal outlines a study of the potential effects of this genre-busting artistic creation. Current literature in educational gaming, social psychology, and media effects, along with newer definitions of resilience from cultural anthropology, suggest a mixed-methods approach. The study proposed here could have implications for the fields of educational games, cultural studies, and mass media.

Project type: Research, Scholarship, and Entrepreneurship

068 - Victoria Elizabeth Combs

Influence of Charge Ordering on Charge Separation in Perovskite Semiconductors

2017 Fall - Chemistry

Perovskites are exciting materials for solar energy applications due to their ability to generate and subsequently separate an electron-hole pair. The structure-property relationships regarding this process are not yet well understood for these materials. Charge ordering is a structural feature which may affect the way a perovskite material separates electrons and holes. To investigate the role of charge ordering on this process we have prepared the perovskite Cs₄Sb₃Br₁₂. Exploration of this system will further our understanding of the origins of electronic properties of perovskites and will provide information for the rational design of the next generation of perovskite solar absorbers.

Project type: Research, Scholarship, and Entrepreneurship

069 - Alistair P. Cook

Globally Competent Engineers: Do International Experiences Matter?

2017 Fall - Education

Study abroad programs and international development organizations give engineering students opportunities to prepare themselves as global professionals through academic and/or hands on practical engineering experiences but does their impact on student development justify the cost? How do students taking part in these opportunities enculture and develop as global citizens compared with student that only undertake engineering design projects on campus. This study aims to compare student's experiences and preparedness to work in global engineering through comparing and contrasting different models of on campus and international based, curricular and co-curricular design programs for their impact on student's professional and global preparedness.

Project type: Research, Scholarship, and Entrepreneurship

070 - Jimikaye Beck Courtney

Modeling Relationships Between Activity, Motor Skills, and Weight in Preschoolers

2017 Fall - Food Science and Human Nutrition

Baseline data from the Colorado LEAP study examined two models evaluating the directionality of the relationship between physical activity and gross motor skills (locomotor, balance and ball skills) in predicting healthy growth (body mass index) in preschoolers. Both models demonstrated acceptable fit. Locomotor skills significantly predicted physical activity and vice-versa, suggesting a reciprocal locomotor-physical activity relationship in preschoolers. Ball skills did not predict physical activity, likely due to preschoolers' low ball skill proficiency. Additional research, including longitudinal analyses, is necessary to determine how the directionality of these relationships changes throughout child development, a next step for the LEAP dataset.

Project type: Research, Scholarship, and Entrepreneurship

071 - Kelley Renee Covington

Acute Effects of Exercise on Energy and Cancer Related Fatigue

2017 Fall - Health and Exercise Science

Fatigue and lack of energy in cancer survivors are improved following exercise programs and interventions, but less is known about the acute effects of a single exercise session. Cancer survivors (N=14) participated in an exercise program 1x/week for 8-weeks, and reported fatigue and energy before and after each exercise session on a 0-10 visual analog scale. Energy significantly increased from pre to post exercise session $M\Delta=0.87\pm0.71$ [$t(13)=4.57$, $p=0.001$]. Current guidelines recommend the 0-10 analog scale to quantify fatigue; however energy may be capturing a different facet of the effects of acute exercise in cancer survivors.

Project type: Research, Scholarship, and Entrepreneurship

072 - Kari Miller Cowden

Effects of Nanotubes on Osteogenic Differentiation of Adipose-Derived Stem Cells

2017 Fall - Mechanical Engineering

Titanium orthopedic implants still experience a high level of failure at the implant site. Earlier studies have shown that nanostructuring the surface of titanium can enhance stem cell migration, proliferation, and differentiation. However, the ideal size of this nanostructuring is still disputed. In this study three distinct diameter controlled nanotube (NT) surfaces were fabricated on titanium sheets using an anodization technique and varied voltages. Adipose-derived stem cells (ADSC) were cultured and proliferation and differentiation was investigated. The results indicate that nanostructured titanium does enhance osseointegration and furthermore that the nanotube diameter does affect the proliferation and osteodifferentiation of ADSC.

Project type: Research, Scholarship, and Entrepreneurship

073 - Jesse Reed Cruce

Harmonization of Economic Analyses for Biofuel Production from Algae

2017 Fall - Mechanical Engineering

Research into the production of biofuels from algae as a potential replacement for fossil petroleum dates back to at least the 1970s. Numerous research efforts have investigated a range of technologies for algal growth and conversion into biofuels. However, comparison of the results from these efforts, particularly the estimated cost of biofuel production, is hindered by the inconsistent economic assumptions made between each model. This work attempts to address this challenge by comparing a range of published models using consistent economic and productivity assumptions. Results suggest that using such a standard set of assumptions can facilitate better cross-technology comparisons.

Project type: Research, Scholarship, and Entrepreneurship

074 - Randie Marguerite Culbertson

Differences in Feeding Behavior for Feedlot and Grazing Cattle

2017 Fall - Animal Sciences

Feeding behavior has been well documented on cattle, however little attention has been given to differences between grazing and feedlot cattle. The objective of this study was to compare feeding behavior for cattle maintained in a feedlot and on pasture. For this project, cattle were fit with an ear tag accelerometer (ETA) to measure eating events, rumination and activity. These measurements were gathered on cattle on feed and pasture. Significant ($P < 0.05$) differences in time spent eating and ruminating between feedlot and grazing cattle were found. These results indicate a difference in feeding behavior between feedlot and grazing cattle.

Project type: Research, Scholarship, and Entrepreneurship

075 - Jenae Marie Curley

Getting the Most Out of Our Fruit and Vegetable Consumption

2017 Fall - Food Science and Human Nutrition

Plants make a variety of phytochemicals that are associated with reduced chronic disease risk. However, most Americans consume fewer fruits and vegetables (F&V) than recommended and select them from a limited number of botanical families. The SMART-Valid study, a controlled feeding study designed to identify chemical biomarkers of F&V intake, explores whether these biomarkers can predict phytochemical diversity in the diet. For this study, we carefully designed menus that varied serving number and biodiversity of F&V. Here, we have adapted these menus to provide a meal plan to meet F&V intake recommendations and maximize exposure to different phytochemicals.

Project type: Research, Scholarship, and Entrepreneurship

076 - James Zachary Curlin

Modeling HIV Evolution from SIV Using a Humanized Mouse Model

2017 Fall - Cell and Molecular Biology

Human Immunodeficiency Virus (HIV) is believed to have arisen in humans due to multiple independent cross-species exposures to Simian Immunodeficiency Viruses (SIV). In this study, the serial passaging of SIV in humanized mice recapitulates the genetic changes that may have facilitated these cross-species transmission events. Viral adaptation to hu-mice was determined by qRT-PCR analysis of plasma viral loads, observation of CD4+ T-cell depletion and genome analysis using Next Generation Sequencing (NGS). This data demonstrated that SIVs can cross the species barrier and infect human immune cells through adaptations required for viral evolution of SIV into a pathogenic human virus.

Project type: Research, Scholarship, and Entrepreneurship

077 - Mangesh Rajendra Dake

Honda Refueling and Evaporative Emissions Computer-Aided Engineering

2017 Fall - Mechanical Engineering

Currently, no predictive capability exists for fuel system performance during refueling. As a result, development of the refueling system (filler pipe geometry, tank geometry and vapor recovery system, etc.) is an iterative process from initial design to final confirmation. A proper design needs to balance several related requirements in addition to Onboard Refueling Vapor Recovery (ORVR), such as filling performance, fuel spit back, system safety as well as meet/overlap with specifications set forth by unrelated function groups. This study aims to develop a CAE model that can predict performance of refueling system before prototyping saving Honda's time and money.

Project type: Research, Scholarship, and Entrepreneurship

078 - Adam Hans Danielson

Advances in CdTe Photovoltaics: Research for Sustainable Clean Energy Solutions

2017 Fall - Mechanical Engineering

Cadmium telluride (CdTe) solar technology has consistently demonstrated one of the lowest costs of energy for utility scale applications. Recent developments at Colorado State University NSF I/UCRC Center for next Generation Photovoltaics have led to some of the highest efficiencies of solar cells fabricated using this technology. Achieving even higher efficiency without a substantial increase in manufacturing costs can lead to further reduction in energy prices which are critical for adaptation and application on a larger scale. CdTe solar cells are also found to be considerably more environmentally sustainable and reliable as compared to traditional silicon solar cells.

Project type: Research, Scholarship, and Entrepreneurship

079 - Marielle Lindsay Darwin

Biofeedback Efficacy in Individuals with Brain Injury: Does Age Matter?

2017 Fall - Psychology

Biofeedback therapy has been demonstrated to improve nervous system function in individuals with traumatic brain injury (TBI). The present study aims to determine if age is a contributing factor to the effectiveness of this treatment in this population. Individuals (n=113) with TBI were recruited from an inpatient rehabilitation facility. Changes in respiration rate, galvanic skin response, and skin temperature were examined across the span of ten sessions. Results indicate that biofeedback is effective for lowering physiological levels but less so for older adults.

Project type: Research, Scholarship, and Entrepreneurship

080 - Dominique Mariflor David-Chavez

A Global Assessment of Climate Studies Engaging Indigenous Knowledge Systems

2017 Fall - Human Dimensions of Natural Resources

Although, international and Indigenous peoples' working groups emphasize Indigenous knowledge systems and the communities who hold them as critical resources for understanding and adapting to climate change, there has yet to be a comprehensive, evidence-based analysis into how diverse knowledge systems are integrated in scientific studies. Do current research practices challenge or support Indigenous communities in their efforts to maintain and appropriately apply their knowledge systems? This study addresses this question using a systematic literature review and meta-analysis assessing levels of Indigenous community participation and decision-making authority in all stages of the research process (initiation, design, implementation, analysis, dissemination).

Project type: Research, Scholarship, and Entrepreneurship

081 - Cat Mcdougald de Vlaming

Effectiveness of Light Traps for Detecting Razorback Sucker Larvae

2017 Fall - Fish, Wildlife and Conservation Biology

Detection of endangered razorback sucker *Xyrauchen texanus* larvae by light traps is used to prompt flow releases to inundate Green River floodplains crucial to survival. However, little is known about the efficacy of light traps to capture or retain larvae. We investigated effects of trap set time, release distance from trap, light presence, and turbidity on capture and retention rates of early life stages. Laboratory capture rates were 90% and decreased 60% with increasing fish size. Retention exceeded 70% overall, but increased 25% with increasing fish size. Relationships between set time and distance should be investigated, along with field testing.

Project type: Research, Scholarship, and Entrepreneurship

082 - Christopher James Dean

AUIR: A High-Throughput Analysis Pipeline for Influenza Sequence Data

2017 Fall - Microbiology, Immunology, and Pathology

We present AUIR, a preliminary analysis platform for the analysis of large amounts of influenza sequence data in parallel. AUIR is built with Nextflow, a computational workflow language. It also uses Docker, a software containerization platform that aids in the installation of the many open-source programs utilized throughout the pipeline. Functionally, the pipeline performs various quality control checks, host-DNA removal, sequence assembly, complete genome annotation, genome coverage statistics, and easy-to-view html summary reports. AUIR is freely available as an open-source package under the MIT license, and can be downloaded via GitHub (<https://github.com/cdeanj/auir>).

Project type: Research, Scholarship, and Entrepreneurship

083 - Heather Leigh Deel

Using Internal Human Rib Microbiomes to Estimate Postmortem Interval

2017 Fall - Cell and Molecular Biology

When human remains are found, any estimation of time since death is usually a wide, ambiguous window. Monitoring bacteria, major drivers of decomposition, allows us to create a microbial clock of what bacteria are present and when during decomposition. Rib samples were taken from human cadavers at the Southeast Texas Applied Forensic Science Facility in Huntsville, TX. The ribs were processed and the 16S ribosomal RNA gene identified bacteria present in the internal microbiome. Key genera were found to be abundant at specific stages in decomposition, suggesting that bacterial composition in ribs could be used to estimate time since death.

Project type: Research, Scholarship, and Entrepreneurship

084 - Carolina Del Pozo Aguilar

Emoji: A Universal Form of Communication

2017 Fall - Journalism and Media Communication

Digital communication entailed the development of a new way of expression. Even though this is not a language, yet, Emoji are the most used choice of "words" in the digital world. Emoji are visual representations of feelings, signs, objects, etc. Their constant use to emphasize ideas, make them pass unnoticed. Adding an emoji to a text can inform us about realism and interpersonal relationships. It is hard to conceive communication using technological resources without these graphical cues. This research is based on describing Emoji nature, evolution and how this schematic representation of facial expressions constitute a source of data collection.

Project type: Research, Scholarship, and Entrepreneurship

085 - Anthony Robert DeMario

Development of a Miniature Legged Robot Using Multi-Material 3D Printing

2017 Fall - Mechanical Engineering

Miniature robots at the centimeter scale are becoming more popular with applications from environmental monitoring, surveillance, to search and rescue. Due to their size and relative complexity, traditional manufacturing and assembly methods cannot be used. This project leverages multi-material 3D printing to print miniature robots as a single unit with soft material as the joints and rigid material as the links and body. It also will give systematic design guidance and a theoretical framework for design and analysis of mechanisms fabricated using multi-material 3D printing with compliant joints as well as an optimization process for linkage synthesis.

Project type: Research, Scholarship, and Entrepreneurship

086 - Mortaza Derakhshani Molayousefi

The Effect of Resins on Asphaltene Aggregation Propensity

2017 Fall - Chemistry

Aggregation of asphaltene molecules causes clogging in the crude oil pipelines and, as a result, an economic burden on the petroleum industry. The role of other components of the crude oil such as resin molecules is not clear. We have performed all-atom molecular dynamics simulations to quantify the aggregation propensity of eight types of model asphaltene molecules. Furthermore, we seek to understand the role of resin in the aggregation of asphaltenes by studying asphaltene systems in the presence of resins. We observe a negative correlation between the presence of resin and the aggregation tendency of the asphaltenes.

Project type: Research, Scholarship, and Entrepreneurship

087 - Katie DeRose

Economic Viability of Algal Biofuel Production through Fermentation and HTL

2017 Fall - Mechanical Engineering

As microalgae becomes a feedstock of interest for biofuels production, technologies have advanced to provide a variety of methods for both cultivation and processing. This study explores the economic viability and environmental impact of processing high productivity, low lipid content algae into biofuels using two different production pathways; 1) Biochemical Processing followed by Hydrothermal Liquefaction (B&T), and 2) whole algal Hydrothermal Liquefaction (HTL). For a feedstock, this study considered high productivity, low lipid content algae. Sensitivity analysis and alternative case modeling on TEA inputs identifies strategic areas for further research in an effort to create a more economically viable process.

Project type: Research, Scholarship, and Entrepreneurship

088 - Deb Lynn Domres

Transdisciplinarity (TD): Dissolving Boundaries among Applied Disciplines

2017 Fall - Education

A case study of transdisciplinary (TD) collaboration among applied disciplines the purpose was to explore the impact of transdisciplinarity on teams, while exploring how knowledge transfers among diverse participants generating transformation. Research and data collection occurred during a two-day charrette, among eight disciplines in eight teams, working either face-to-face (on-site) or off-site (virtually) in a university setting applying Liquid Galaxy/GPS. Teams were challenged to develop an educational venue for diverse learners including K-12/ Higher education students and community members on a 3,400-acre working cattle ranch, utilizing historic homesteads during a proposed renovation at Cherokee Ranch & Castle in Sedalia, Colorado.

Project type: Research, Scholarship, and Entrepreneurship

089 - Enrique Doster

Antimicrobial Use in Beef Feedlot Production and Microbiome Dynamics

2017 Fall - Microbiology, Immunology, and Pathology

The increasing prevalence of antimicrobial resistance (AMR) is a global public health concern, and is commonly hypothesized to be "driven" by antimicrobial use (AMU) in humans and food producing animals. Traditionally, studies of AMR use aerobic culture of a few indicator bacteria, but recent advancements in high-throughput sequencing can be employed to provide a holistic perspective into AMR ecology by sequencing DNA from the entire microbiome, including the "population" of resistance genes (the resistome). Our study uses high-throughput sequencing to characterize the microbiome and resistome ecology in Canadian beef feedlot operations and evaluates the impact of AMU on AMR.

Project type: Research, Scholarship, and Entrepreneurship

090 - Channing Faith Downing Bice

Love across Borders and Travel Bans

2017 Fall - Journalism and Media Communication

7,500 miles; seven Muslim majority countries; six embassies; five years; two people; one proxy marriage. As if straight out of a movie or TV series, this project explores a five-year love story with one major hurdle; United States Immigration Laws and their many intricacies. However, this isn't television, lives are put on hold, either temporarily or permanently, and loved ones can be separated based on legislative laws and executive orders.

Project type: Research, Scholarship, and Entrepreneurship

091 - Aryeh Jacob Drager

Convective Cold Pool Responses to Soil Moisture

2017 Fall - Atmospheric Science

Convective cold pools are the blasts of cool air that we experience near the ground in association with rainstorms, and they can play an important role in triggering the formation of new storms. This work investigates how the moisture of the soil beneath tropical rainforest cold pools affects the properties of the cold pools. We conduct numerical simulations and use a novel tracking algorithm to analyze the cold pools that form. Our results indicate that decreasing the soil moisture results in stronger cold pools and weaker "rings" of enhanced water vapor surrounding the cold pools.

Project type: Research, Scholarship, and Entrepreneurship

092 - Ali Ebrahimpour Boroojeny

A New Graph Kernel Based on Traversal Edit Distance (GTED)

2017 Fall - Computer Science

In this project, we introduce a new measure for computing the distance of two graphs which states how similar those graphs are. Later, this measure can be used to make a kernel for the known dataset of a problem that can be modeled with a graph in which the entities can be represented as vertices and their relationship as edges that connect two of the vertices. This kernel can be used in machine learning methods like SVM to predict the properties of a new graph by computing its similarity to the graphs for which we already know the desired properties.

Project type: Research, Scholarship, and Entrepreneurship

093 - Kari Hope Ecklund

A Novel Mechanism of Dynein Regulation by Microtubule-Associated Protein She1

2017 Fall - Biochemistry and Molecular Biology

Motion is an integral part of what we all might include in our definition of life. Specifically, motion with a purpose is the most fascinating concept in biology. To function and survive, our cells rely on molecules being at the right place at the right time within the cell. But how do cells, whose internal environments are as crowded and chaotic as rush-hour on I-25, achieve the organized symphony of molecules that allow us to exist? We study the directed movement of molecules by motor proteins, which transport these molecules along a cytoskeletal highway to their respective destinations.

Project type: Research, Scholarship, and Entrepreneurship

094 - Bridget E. Ecklund

Effect on Microbiome and Immune Response from a Recombinant Bacterial-Vaccine

2017 Fall - Microbiology, Immunology, and Pathology

Abundant evidence has shown the powerful influence the gut microbiome can have on its host, including nutrient processing, gut homeostasis, and immune development. Here, we are utilizing a recombinant *Lactobacillus acidophilus* (rLA) probiotic vaccine vector that expresses a peptide antigen from the mucosal pathogen HIV-1 to demonstrate a safe and efficacious mucosal vaccine. Our results show mice orally gavaged with rLA develop intestinal and vaginal IgA responses and systemic IgG against the HIV-1 peptide. We also saw changes in the gut microbiome throughout vaccination. We hypothesize that rLA can be engineered to induce protective immune responses against other mucosally-transmitted pathogens.

Project type: Research, Scholarship, and Entrepreneurship

095 - Megan R. Emmons

Modelling Emergent Swarm Behavior in Robots for Mapping Unknown Environments

2017 Fall - Electrical and Computer Engineering

Robotic swarms are comprised of simple, individual robots but can collectively accomplish complex tasks through frequent interactions with other robots and the environment. One pertinent objective for swarms is mapping unknown, potentially hazardous environments. We show that the collective or emergent behavior of a swarm observed at one area can be used to infer the presence of obstacles in an unknown environment even when the robots are unable to communicate and have limited sensing capabilities. In the process, we present a general methodology for mapping the discrete, individual robot behaviors to a continuous time model of the emergent behavior.

Project type: Research, Scholarship, and Entrepreneurship

096 - Colby Evans

Single Particle Electrochromics

2017 Fall - Chemistry

Nanostructured tungsten trioxide (WO₃) electrochromic devices potentially offer shorter switching times than compact thin films because their high surface area provides shorter ion intercalation path lengths during device operation. Nanostructured electrochromic devices are generally characterized with ensemble-averaging light absorption and electrochemical methods, where the performance of individual particles is forfeited. Here, we report first-of-their-kind single particle electrochromic behavior of individual WO₃ nanorods under working device conditions. Specifically, we will focus on how the optical density and ion-intercalation kinetics depend on the physical properties of individual particles. Project type: Research, Scholarship, and Entrepreneurship

097 - Michelle Renee Fallon

Synthesis of Low-Temperature Solid-State Materials Using a Triphenylphosphine Flux

2017 Fall - Chemistry

Though solid-state materials have widespread applications, their syntheses often require high temperatures to promote diffusion. Since many materials have interesting low-temperature phases, novel syntheses to make these phases are needed. This research focuses on synthesizing metal chalcogenides using a triphenylphosphine flux. The synthesis of tetragonal iron selenide was optimized, and the synthesis of other metal chalcogenides was explored. It is hypothesized that the chalcogen interacts with the triphenylphosphine promoting reactivity although additional research is necessary to determine the exact nature of the reaction. This demonstrates a novel technique that enables materials discovery and simplifies the synthesis of known materials.

Project type: Research, Scholarship, and Entrepreneurship

098 - Caylee Falvo

Immunity and Growth Trade-offs Vary with Elevation in a Hibernator

2017 Fall - Ecology

Populations of the same species can express important differences in life history traits, often apparent when comparing populations along an elevation gradient. We quantified the relationship between immune function and growth in two populations of Uinta ground squirrels separated by 600 meters in elevation. Higher elevation yearlings and adults grew faster in their shorter active season at the expense of immune function, whereas lower elevation individuals did not suffer any apparent trade-offs. This trade-off was not detected in juveniles, which improved in immunocompetence throughout the season. This study demonstrates different life history strategies in populations that experience contrasted resource phenologies.

Project type: Research, Scholarship, and Entrepreneurship

099 - Kristen Marie Fedak

Understanding Relationships Among Health-Relevant Pollutants Emitted from Cookstoves

2017 Fall - Environmental and Radiological Health Sciences

Approximately 40% of the world's population uses biomass-burning cookstoves. Exposure to air pollution from cookstoves is a leading risk factor for morbidity and mortality. Particulate matter (PM_{2.5}) and carbon monoxide (CO) are the primary metrics used to quantify exposures, however, emissions include many other health-relevant pollutants. We conducted laboratory tests to characterize emissions from 28 stove/fuel combinations. Results indicate that emissions of many health-relevant pollutants do not decrease across supposedly improved stove categories. PM and CO emissions are not well correlated with each other or with other pollutants, implying that other pollutants should be considered when quantifying cookstove health risks.

Project type: Research, Scholarship, and Entrepreneurship

100 - Mackenzie Jayne Ferrante

Improving Vegetable Intake Amongst Children in Restaurants: A Pilot Study

2017 Fall - Food Science and Human Nutrition

To determine if an optimal default, a vegetable pre-load (appetizer), would increase children's intake of vegetables during the dinner meal in a restaurant, researchers recruited 19 families to take part in three evening meals at CSU's Aspen Grille. The results demonstrate that children significantly increase their intake of carrots when they are served prior to the main meal. Calorie counts for the three meals were not significantly different from one another. This study may provide new strategies for restaurants to increase vegetable consumption in children without costly menu overhauls.

Project type: Research, Scholarship, and Entrepreneurship

101 - Jessie Ellen Filer

Nuclease-Protection ELISA for Colorimetric and Electrochemical Detection of Nucleic Acid

2017 Fall - Cell and Molecular Biology

New diagnostic platforms are needed to provide rapid diagnosis. We have developed a nuclease protection-integrated ELISA (NP-ELISA) for the detection of nucleic acid (NA). Target NA protects an oligo probe from nuclease digestion and the assay then follows an ELISA workflow with an HRP-conjugated antibody binding to the probe. HRP oxidizes TMB to generate a colorimetric or electrochemical signal and the amount of product is directly proportional to the amount of bound target molecules. Our findings demonstrate reproducible sensitivity and specificity that make the NP-ELISA suitable as a new technology for nucleic acid detection.

Project type: Research, Scholarship, and Entrepreneurship

102 - Emily Kay Fischer

Potential Influence of Red Beetroot Juice Consumption on Endothelial Function

2017 Fall - Food Science and Human Nutrition

Atherosclerotic cardiovascular disease (CVD) is the leading cause of death worldwide. Endothelial dysfunction is a major initiating step in the pathophysiology of CVD. Red beetroot juice (RBJ) contains bioactive compounds including phenolic acids, flavonoids, betalains, ascorbic acid, and nitrate. Previous research suggests RBJ can improve endothelial function. In a randomized, double-blind, placebo-controlled crossover clinical trial, 16 healthy, overweight/obese men and postmenopausal women aged 40-65 years are consuming RBJ, nitrate-free RBJ, placebo + nitrate, or placebo for 4 weeks. Endothelial function is assessed at baseline and 4 weeks. RBJ is anticipated to exert the greatest effects on endothelial function.

Project type: Research, Scholarship, and Entrepreneurship

103 - Dana Anne Flett

Influence of Hydrology, Vegetation, and Land Use on Carbon Dynamics

2017 Fall - Ecology

Fen wetlands are important carbon reservoirs yet many factors can degrade these ecosystems. I measured water table dynamics, vegetation composition, CO₂ fluxes, and impacts due to cattle trampling at four fens in the northern Sierra Nevada of California. My goal was to understand their natural functioning and the effects of cattle grazing and drainage. Untrammeled areas were carbon accumulating while cattle trampling had a negative effect on carbon sequestration. Any amount of cattle trampling negatively affected carbon accumulation and greater disturbance resulted in greater carbon loss. Trampling had a greater negative effect on carbon sequestration than water table drawdown.

Project type: Research, Scholarship, and Entrepreneurship

104 - Nora Elizabeth Flynn

Investigating Deficit Irrigation as a Climate-Smart Management Opportunity

2017 Fall - Soil and Crop Sciences

Sustainable food production in semi-arid climates depends on the development of water-saving strategies. Many alternative irrigation practices are being tested, yet few have investigated the impacts of on belowground properties which are critical for crop production. This study examines deficit irrigation (DI) as a strategy to reduce water usage while minimally impacting corn yield. Deficit irrigation impacted corn root growth, the soil microbial community, and soil carbon storage. Greenhouse gas emissions were reduced under deficit irrigation. Our results demonstrate the importance of assessing the impacts of new management practices on important soil processes to better inform farmer decision-making.

Project type: Research, Scholarship, and Entrepreneurship

105 - Alex M. Fout

Protein Interface Prediction Using Graph Convolutional Networks

2017 Fall - Statistics

Determining the interface between two interacting proteins can help illuminate cellular biology, improve our understanding of disease, and aid pharmaceutical research. Such determination is expensive and time consuming using wet-lab experiments, which has motivated the development of computational methods. Inspired by the success of deep learning in image processing and other application areas, we adapt convolutional neural networks to work with irregularly structured data, such as proteins. We construct a novel pairwise classification architecture which is trained and tested with data from the Docking Benchmark Dataset versions 4.0 and 5.0. This outperforms the existing state-of-the-art prediction method, PAIRpred.

Project type: Research, Scholarship, and Entrepreneurship

106 - Sean William Freeman

Flying into Thunderstorms

2017 Fall - Atmospheric Science

Supercellular thunderstorms pose a significant threat to humankind by virtue of the severe weather they produce, including tornadoes, large hail, lightning, and heavy rainfall. While the dangers of supercells are well known, the mechanisms by which they form and develop are not completely understood, partially owing to a lack of observational data in and around severe thunderstorms. This project uses new observational capabilities allowed by small Unmanned Aerial Systems (commonly referred to as drones) to observe the outflows produced by thunderstorms that are poorly understood.

Project type: Research, Scholarship, and Entrepreneurship

107 - Alex Jeanette Friedl

Monumental Architecture and Power at Angamuco (Michoacán, Mexico)

2017 Fall - Anthropology

At the ancient Purépecha urban center of Angamuco in the Lake Pátzcuaro Basin, Michoacán, Mexico, LiDAR imaging has proven effective for analyzing monumental architecture at the site scale. Mounds, platforms, and pyramids held symbolic importance and their ubiquity on the landscape reflects the powerful, centralized Purépecha bureaucracy. Urban growth during the Middle Postclassic (A.D. 1200-1350) likely sparked monumental construction, however building continued in the Late Postclassic (A.D. 1350-1520). By locating monumental structures and analyzing their distribution through time and space, we can explore urban expansion over the malpaís region and decision making that went into placement of monumental infrastructure.

Project type: Research, Scholarship, and Entrepreneurship

108 - Blake Fullenwider

Preparation of Alternative Feedstock Powders for Use in Additive Manufacturing

2017 Fall - Mechanical Engineering

Gas atomized (GA) powders are the most common feedstock for state-of-the-art metal additive manufacturing (AM) because of its spherical morphology and controllable particle size distribution. However, significant resource consumption, e.g., energy and inert gas, are required to produce GA powders, leading to high costs and limited availability in alloy compositions. To fulfill the growing demand for alternative and sustainable feedstock production for metal AM, the present work aims to explore a mechanical milling strategy to prepare stainless steel powders from recycled machining swarf. The powders fabricated in various milling conditions are characterized in terms of morphology, particle size, and microstructure.

Project type: Research, Scholarship, and Entrepreneurship

109 - Sarah M. Gallup

Wet, Wetter, Wettest: Amazonian Rainforest Responsiveness to Recent Precipitation

2017 Fall - Ecology

The Amazonian rainforest's massive gas exchanges with the atmosphere strongly influence global CO₂ concentrations. Scarce measurements have created continuing controversy about the rainforest's responses to dry episodes. An emerging data source is solar-induced fluorescence (SIF), a proxy for photosynthetic rate. We compare satellite SIF estimates to rainfall in the prior 30 days. In the wettest regions of the Amazon, photosynthesis barely respond to recent rain. Responsiveness is somewhat stronger in subregions with longer dry seasons. This systematic variability will be the foundation for a metric to evaluate model projections of Amazonian photosynthesis.

Project type: Research, Scholarship, and Entrepreneurship

110 - Maybellene Pascual Gamboa

Beating the Heat with Bigger Beaks: Adaptation in Island Birds

2017 Fall - Ecology

Understanding how populations are adapted to local environments is critical for managing species for future environmental change particularly in the context of species reintroductions. Reintroducing individuals that are maladapted to an environment can result in mortality or reduced fitness, thereby wasting conservation resources. Here, we infer local adaptation in bill morphology in Channel Island song sparrows (*Melospiza melodia graminea*) using genomics techniques. We found birds on hotter islands have larger bills, presumably for increased heat dissipation, and that these differences are genetically-based. This suggests larger-billed birds may be ideal candidates for reintroduction to a warmer island where birds were extirpated.

Project type: Research, Scholarship, and Entrepreneurship

111 - Ariana Lucia Garcia

Examining the Role of Social Support for First-Generation College Students

2017 Fall - Education

This study seeks to determine the relationship between social support and the commitment to college of first-generation college students (FGCS). Previous research shows that social supports can look very different between FGCS and non-FGCS (Dennis, Phinney, & Chuateco, 2005). This study uses the adapted version of the Student Adaptation to College Questionnaire (Baker & Siryk, 1989) and the Social Provisions Scale (Cutona & Russell, 1987). This research hopes to determine the relationship between how FGCS perceive their social support and their commitment to staying in college and completing their degree.

Project type: Research, Scholarship, and Entrepreneurship

112 - Shane Daniel Garland

Experimental Validation of a Waste Heat Driven Cooling System

2017 Fall - Mechanical Engineering

Power generation systems are one of the largest consumers of water in the United States, using 40% of all withdrawals. Approximately 4% of this water is evaporated in the form of vapor plumes from cooling towers (roughly 4.5 Olympic-sized swimming pools of water per minute). The aim of the current investigation is to experimentally validate a Turbo-Compression Cooling System (TCCS) that converts normally wasted exhaust heat into a cooling effect used to offset the power plant cooling load. By offsetting the power plant cooling load, evaporative cooling towers can be removed from power plants, thus saving water.

Project type: Research, Scholarship, and Entrepreneurship

113 - Philip Jacob Gasser

Effects of Curcumin on SCFA Production via the Gut Microbiota

2017 Fall - Food Science and Human Nutrition

Turmeric has been touted as a powerful anti-inflammatory root due to its active compound, curcumin. This polyphenol has been shown to be active in laboratory settings; however, its bioavailability in humans is limited. Therefore, its use as an effective treatment or preventative for inflammatory diseases remains to be elucidated. A healthy gut environment and balanced microbiota may help reduce systemic inflammation. Therefore, we propose that curcumin exerts health benefits in humans by modifying the gut environment. Using human stool collected from a high-fat, overfeeding study we are investigating the impact of curcumin consumption on intestinal health.

Project type: Research, Scholarship, and Entrepreneurship

114 - Mahsa Ghorbani

A New Stock Price Prediction Method Using Covariance Information

2017 Fall - Walter Scott, Jr. College of Engineering

The literature provides strong evidence that stock prices can be predicted from past price data as well as other fundamental and macroeconomic variables. Given past data, the multivariate conditional mean is used as a point estimator to minimize the mean square error of prediction. However, the calculation of the condition mean and covariance involves numerical issues. To overcome this problem, we propose a filtering operation using covariance information based on principle component analysis. We use daily historical price data for General Electric Company to illustrate our method, which shows promising results in terms of the estimation performance and volatility.

Project type: Research, Scholarship, and Entrepreneurship

115 - Andrew Robbins Gillespie

A New Perspective on Vincent Persichetti's King Lear

2017 Fall - Music, Theatre and Dance

Vincent Persichetti was one of the greatest American composers in the 20th century. This project examines the original manuscript to his chamber piece King Lear from the archives in the New York City Public Library. The information gathered resulted in a new level of insight by connecting the 1977 publication of the work with Martha Graham's 1949 ballet, Eye of Anguish, for which the piece was originally written. The research presented will serve as a guide to the study and performance of King Lear.

Project type: Research, Scholarship, and Entrepreneurship

116 - Ben Donald Golas

Grab Your Batpacks: Measuring White-Nose Syndrome Affected Bats' Hibernation Conditions

2017 Fall - Ecology

White-nose syndrome, caused by the fungus *Pseudogymnoascus destructans*, has killed over 6 million hibernating bats, but remnant populations are observed in white-nose syndrome-affected areas. We hypothesize that these bats choose hibernation temperatures and humidity (microclimates) that limit fungal growth. We modified temperature-humidity data-loggers to create miniaturized, waterproof "batpacks" to be sutured onto bats. Batpacks measure hibernation microclimate choices for use in a statistical model that predicts individuals' survival probability and populations' disease-related mortality. We are currently deploying full-function prototype batpacks on bats and will use them to predict bat population survival across the country, expecting survivors to choose fungus-limiting microclimates. Project type: Research, Scholarship, and Entrepreneurship

117 - Daniel Benjamin Goldschmidt

Music Therapy and Music Cognition: Parallel Fields

2017 Fall - Music, Theatre and Dance

The current project is building a connection between the fields of music therapy and music cognition. Music therapists research and practice evidence-based musical interventions to reach non-musical goals with clients in many different populations. Music cognition is a field learning about cognitive, perceptual, and behavioral aspects of music and humanity. While seemingly similar, they are frequently detached despite asking similar questions. My goal is to go forward and educate music therapists, the public, possible employers, and other health professionals on utilizing music neuroscience research in practice. By working in partnership these two fields can do the most good for humanity.

Project type: Research, Scholarship, and Entrepreneurship

118 - Natalie Danielle Marie Goodwin

SMART-Valid: Identification of Biomarkers of Fruit and Vegetable Intake

2017 Fall - Food Science and Human Nutrition

Fruit and vegetable (F&V) intake is negatively correlated with risk of developing multiple chronic diseases; however, the ability to accurately assess F&V consumption is hampered by a lack of reliable biologic markers. The identification of such biomarkers would enhance current dietary assessment methods and provide a quantifiable, non-biased measurement to evaluate compliance in nutritional epidemiology studies and monitoring of nutrition education programs. Therefore, we conducted a two-armed, fully controlled feeding study to identify urinary metabolites that are predictive of dietary F&V intake. Using ICP-MS, we explored ion profiles useful in distinguishing between high and low F&V diets.

Project type: Research, Scholarship, and Entrepreneurship

119 - Robert J. Griffin-Nolan

Plant Trait Diversity Explains Grassland Responses to Drought

2017 Fall - Ecology

We aim to identify plant traits that are useful for understanding grassland responses to extreme drought. Plant traits related to hydraulic function were measured in several dominant plant species across six grasslands in the central US. These grasslands vary in their responses to drought (based on plant biomass measurements following a drought in 2012, which reduced rainfall by 40% compared to the long term mean across the region). We show that the diversity of traits within a site, rather than trait means, explains a large portion of the variability in grassland sensitivity to drought.

Project type: Research, Scholarship, and Entrepreneurship

120 - Kira Ann Griswold

FarmRise: Affordable, Accessible, Adoptable Agricultural Products Direct to Smallholder Farmers

2017 Fall - College of Business

FarmRise is a social enterprise model, developed by Colorado State GSSE MBA students from our field research in Kenya. FarmRise is a direct peer-to-peer sales and distribution model providing smallholder farmers access to affordable agricultural products. Through a facilitated approach, farmers are encouraged to purchase and adopt products to improve farm productivity, livelihoods, and food security.

Project type: Research, Scholarship, and Entrepreneurship

121 - Carolina Gutierrez

Insects Role Changes in Streams under Shifting Environment and Climate

2017 Fall - Ecology

Functional diversity quantifies the value and range of organismal traits influencing species roles and performance in ecosystems. Aquatic insect functional diversity has been examined previously, but not in the context of strong environmental and climate gradients. We quantified and tested differences in three primary components of functional diversity of stream insects along an altitude gradient: Functional Richness (FRic), Functional Evenness (FEve) and Functional Divergence (FDiv). 24 small streams in three adjacent basins were studied; spanning an elevational range of 2000-3500 m. Our results showed that only FRic differs significantly with altitude, and this pattern of change remains constant across basins.

Project type: Research, Scholarship, and Entrepreneurship

122 - Angela Rose Hanna

Plasma Surface Modification of Zeolites with Gas Phase Diagnostics

2017 Fall - Chemistry

An emerging theme in the plasma community revolves around improving the effectiveness of low-temperature plasmas as a method for pollution remediation. Advances are limited due to a vast data gap regarding the fundamental gas phase chemistry and the resulting gas-surface interface interactions for potential catalysts, specifically zeolites. In addition to studying the material, gas phase emission and absorption spectroscopies examine the interactions between zeolites and plasmas, probing the effect of a substrate on plasma internal temperatures. These studies provide a molecular level understanding of the chemical mechanisms within these systems, profoundly influencing our ability to design high performing advanced materials.

Project type: Research, Scholarship, and Entrepreneurship

123 - Edwin L. Harris

A GIS Approach to Identifying Roadways in an Ancient City

2017 Fall - Anthropology

The growing adoption of Light Detection and Ranging (LiDAR) for archaeological analysis makes determining how people moved through space more practical. Here I discuss preliminary results from a project analyzing LiDAR data to identify and extract road networks from the ancient Purépecha city of Angamuco. By using the GIS software ArcMap, the possible roadways were identified visually and a Least Cost Path analysis (LCP) was also applied to the study area. The combination of the visually identified road network and the LCP provides a future avenue of approach to determine the ancient Purépecha's movement through space at Angamuco.

Project type: Research, Scholarship, and Entrepreneurship

124 - Shannon Christine Hartley

Red Beetroot Juice for Attenuating Postprandial Dysmetabolism in Overweight/Obese Adults

2017 Fall - Food Science and Human Nutrition

Postprandial dysmetabolism is associated with developing type 2 diabetes and cardiovascular disease. Red beetroot juice (RBJ) contains bioactive compounds that may improve postprandial dysmetabolism. We are conducting a randomized, double-blind, placebo-controlled, crossover clinical trial in overweight/obese men and postmenopausal women aged 40-65 years to assess the impact of RBJ, nitrate-free RBJ, placebo, and placebo + nitrate on postprandial dysmetabolism. Blood is collected prior to treatment and high-fat meal consumption, and 1, 2, and 4 hours postprandially to assess blood insulin, glucose, and triglyceride concentrations. We hypothesize that consumption of RBJ will exert the greatest effect on attenuating postprandial dysmetabolism.

Project type: Research, Scholarship, and Entrepreneurship

125 - Emad Hassan

A Framework for Seismic Resilience and Recovery of Hospital Clusters

2017 Fall - Civil and Environmental Engineering

Understanding the behavior of hospitals is essential especially after major earthquakes. A comprehensive framework is presented to estimate losses of hospital clusters, quantity and quality functionality and recovery. The framework includes the recovery of different lifelines and is applied to Shelby County as a testbed to investigate the effect of interdependence on functionality and recovery assessment as well as the mutual effect of the hospitals. A patient-driven model is introduced to estimate the demand on each hospital, which affects the quality of the hospitalization service. This framework can be utilized by emergency planners for pre- and post-disaster recovery management.

Project type: Research, Scholarship, and Entrepreneurship

126 - Kelly N. Hassell

Novel Anticancer Drug Delivery System... "Metallocages"

2017 Fall - Cell and Molecular Biology

Cisplatin anticancer drug resistance impacted an increasing number of patients in most recent years. Metal speciation of the anticancer drug cisplatin is triggered by the changes in the cellular environment, forcing increased toxicity and eventually resistance. Palladium metallocages (Pd-cages) encapsulating cisplatin can be directly injected into cancer tumor regions to ensure safer, targeted drug delivery without raising internal toxicity levels and causing cisplatin resistance. This novel drug delivery system is more cost effective and has the capacity to monitoring the anticancer drug agent release intracellularly and the death of cancer tumors via a fluorophore tag.

Project type: Research, Scholarship, and Entrepreneurship

127 - Adam Michael Heck

Modulation of mRNA stability through RNA methylation in stem cells

2017 Fall - Cell and Molecular Biology

Cell-state transitions, like stem cell differentiation or the maternal-to-zygotic transition, are critical events throughout the life cycle of an organism. To perform a successful transition like differentiation, cells must induce a global change in gene expression. During this time, it is critical to remove 'old' mRNAs, yet leave new ones intact for the new phenotype. RNA methylation can serve as a marker for the cell to distinguish between the two populations of mRNAs, allowing for coordinated transcript-specific decay. YTHDF2 is a protein that recognizes methylated RNAs and facilitates their degradation, and may help to coordinate clearance of unwanted mRNAs.

Project type: Research, Scholarship, and Entrepreneurship

128 - Mohammadhasan Hedayati

Protein Interaction with Glycocalyx-Mimetic Surfaces: A Candidate for Blood-Compatible Materials

2017 Fall - Chemical and Biological Engineering

Biomaterials and medical devices induce tissue responses when they get into contact with human blood and rapidly becomes covered with a layer of nonspecifically adsorbed proteins. For blood contacting devices, protein adsorption is undesirable and is generally the first event in blood coagulation. The polymer coating on solid surfaces is an efficient approach for modification of materials to design protein resistant biomaterials. The aim of this work is to mimic the endothelial glycocalyx layer on the surface of blood vessels, which is responsible for anticoagulant activity by restricting molecules such as proteins from reaching the endothelium.

Project type: Research, Scholarship, and Entrepreneurship

129 - Katrina Nicole Hedrick

Critical Issues Facing Music Education: Analyzing The Music Educators Journal

2017 Fall - Music, Theatre and Dance

As the most widely disseminated publication in the music profession, The Music Educators Journal is a scholarly practitioner journal available to music educators worldwide. The study's authors examine the past five years of trends in content, discuss their social implications, and anticipate the forward trajectory of our musical culture as it applies to K-12 music education. Data was collected, critically examined, and formatted into an accessible resource for music educators. This research is intended to foster the growth of informed musicians, educators, and positively influence educators in the use of the Music Educators Journal in their own reflective practice.

Project type: Research, Scholarship, and Entrepreneurship

130 - Natascha Heise

Implementation of Case Studies in the Undergraduate Cadaveric Classroom

2017 Fall - Biomedical Sciences

Learning and studying human anatomy is often associated with using rote knowledge. Novice students memorize terms and structures in the laboratory with little reasoning skills. In attempt to promote application, integration, and critical thinking skills we introduced case based study into the human anatomy course at CSU. Early implementation suggested little change in student's ability to solve novel problems using simple recall in attempt to answer case study questions. Here, we describe a novel approach using a 5-step method to promote critical thinking. Results suggest students improve in key skill areas such as application of knowledge and student outcomes.

Project type: Research, Scholarship, and Entrepreneurship

131 - Keni B. Herman

Asante Sana Energy Solutions

2017 Fall - College of Business

Our business's goal is to improve conditions in unelectrified rural communities in the Lake Bunyonyi region of Uganda through better access to affordable electricity using a DC solar microgrid. The microgrid has a hub of a solar panels with wires running to 30-50 homes and businesses. Based on research conducted over six weeks in Uganda, we have concluded an average willingness to pay of 20,000 Ugandan Shillings (\$5.55 USD) for a month of service. We plan first to complete a pilot project and then to expand. Our ultimate mission is to create a large scale impact for Uganda.

Project type: Research, Scholarship, and Entrepreneurship

132 - Derek Eugene Hess

Impact of Flue Gas Integration on Advanced Microalgae Biofuel Production

2017 Fall - Mechanical Engineering

Industrial production of microalgae for advanced biofuels requires the integration of CO₂ sources such as flue gas from coal power plants. Heavy metals in flue gas will ultimately be introduced to microalgae growth systems and impact the quality of produced biofuel. Flue gas heavy metals were found to decrease microalgae (*Nannochloropsis salina*) growth and biofuel yields, producing a net negative impact of 71%. Further research determined heavy metals Cu and Ni have highly detrimental effects on microalgae growth. Current research indicates that by utilizing flue gas devoid of Cu and Ni significant improvements in microalgae and biofuel production are achieved.

Project type: Research, Scholarship, and Entrepreneurship

133 - Gavin Lee Hester

Discovery of a New Quantum Dimer Magnet with Uncommon Properties

2017 Fall - Physics

A canonical quantum phase of matter in condensed matter physics is the quantum dimer magnet. These consist of entangled electrons forming spin singlets within a solid. An interesting phenomenon occurs in these materials called Bose-Einstein condensation (BEC), most famously observed in ultracold gases, that is characterized by changes in properties at critical applied magnetic fields. The compound Yb₂Si₂O₇ shows evidence of exhibiting this BEC state with smaller critical fields than normally seen, allowing measurement of the full phase diagram. Measurements of magnetization, specific heat, and inelastic neutron scattering performed on single crystals of this compound provide conclusive evidence of BEC.

Project type: Research, Scholarship, and Entrepreneurship

134 - Hailey Hibbard

Synthesis of an Enzyme-Activated Nitric Oxide-Releasing Antibacterial Prodrug

2017 Fall - Chemistry

Bacterial resistance to antibiotics is spreading at an alarming rate. Without the development of new antibiotics, common infections will become deadly. The goal of this project is to synthesize an enzyme-activated antibiotic prodrug that detects and kills bacteria. The antibiotic will incorporate nitric oxide, a known antibacterial agent, and a fluorescent compound to visualize bacterial presence. A synthesis procedure was developed to synthesize a fluorescent compound attached to a small signaling compound. A nitric oxide donor will be added in the future. In the presence of bacteria, the antibiotic prodrug is designed to simultaneously fluoresce and release nitric oxide.

Project type: Research, Scholarship, and Entrepreneurship

135 - Jasmin Alexis Hicks

Bridging the Ultrastructural Gap at the Neuromuscular Junction

2017 Fall - Biomedical Sciences

The neuromuscular junction (NMJ) acts as a bridge between two important cell types in higher organisms: nerve and muscle. Proteins essential for cell-to-cell communication here are highly concentrated and specifically organized into active zone material (AZM). However, the location of specific proteins within the AZM remains unknown. My research aims to exploit the fast, cost effective, genetic system of *Drosophila* to further elucidate the AZM. Determining the structure of AZM in *Drosophila* will allow us to discover functional relationships of proteins within the AZM and will provide insight into the physiological roles of human proteins through homologs.

Project type: Research, Scholarship, and Entrepreneurship

136 - Stacey Marie Hitchcock

Nocturnal Convective Environments Observed During the PECAN Field Campaign

2017 Fall - Atmospheric Science

During the 2015 Plains Elevated Convection at Night (PECAN) field campaign, 14 mesoscale convective system (MCS) environments were sampled by an array of instruments including over 500 radiosondes launched by teams at fixed and mobile sites. Vertical profiles of the observed pre-convective environments can be objectively categorized as: 1) those with a near-surface stable layer and elevated instability; 2) those with deep moist neutral boundary layers; and 3) those with shallow moist neutral boundary layers. Profiles taken in post-convective environments demonstrate significantly more variability. This research examines the evolutions of observed nocturnal MCS environments, and the organization of observed convection.

Project type: Research, Scholarship, and Entrepreneurship

137 - Kristin Ruth Hoelting

Pathways for Use of Cultural Ecosystem Services Knowledge in Decisionmaking

2017 Fall - Human Dimensions of Natural Resources

Integration of knowledge systems can improve environmental decision-making processes and outcomes. Knowledge integration requires that a comprehensive range of values arising from human interactions with nature be considered. The Ecosystem Services (ES) Framework is a promising approach to improve value representation, but practitioners struggle to adequately account for intangible values associated with the cultural ecosystem services (CES) category. This research will identify opportunities for improved use of CES knowledge by: 1) defining CES knowledge; 2) identifying variables influencing use of CES knowledge; and 3) piloting an assessment methodology that identifies opportunities for enhanced integration of CES knowledge in decision making.

Project type: Research, Scholarship, and Entrepreneurship

138 - Matt Gregory Hogan

Estimating a Systematic Uncertainty in High Energy Particle Physics

2017 Fall - Physics

T2K is an international particle physics experiment generating an intense beam of subatomic particles called neutrinos. T2K is designed to measure the parameters that describe a quantum mechanical process called flavor oscillation where a neutrino of definite flavor (type) is created and later observed as a different flavor. Knowledge of the background channels in T2K is critical for constraining our measurements of the oscillation parameters. A novel study on estimating a systematic uncertainty on a background channel is presented.

Project type: Research, Scholarship, and Entrepreneurship

139 - Ellen Elnes Holbrook

Identifying a Common Data Model Approach for Veterinary Medical Records

2017 Fall - Clinical Sciences

Observational Medical Outcomes Partnership (OMOP) and Systematized Nomenclature of Medicine (SNOMED) are common clinical terminologies used to encode human electronic medical records and allow for modeling of diseases and other factors of interest. However, veterinary medical records have vastly lacked this level of organization. In partnership with UC Denver's Anschutz Medical Campus and other institutions with a similar medical-veterinary school partnership, this project aims to determine a database structure to align veterinary records with OMOP's Common Data Model and enhance One Health and translational medicine concepts by establishing encoding and modeling procedures applicable to both human and veterinary medicine.

Project type: Research, Scholarship, and Entrepreneurship

140 - Caitlin A. Holland

The Space Between: Mapping Prehistoric Farming Districts in Northwestern Colorado

2017 Fall - Anthropology

With the introduction of horticultural practices in northwestern Colorado approximately 1,000 years ago, the ruins of prehistoric masonry granaries represent a storage strategy utilized by the Fremont people to preserve perishable goods and maize near their communities. It has been posited that in northwestern Colorado, granaries are primarily found in three geographic locations: Dinosaur National Monument, Skull Creek Basin, and the Canyon Pintado Historic District, all of which are located within a 1,200-square mile area. My poster discusses my research on the spatial clustering of granaries and how it legitimizes these locations as distinct Fremont populations.

Project type: Research, Scholarship, and Entrepreneurship

141 - Chris Allen Hosier

Developing and Controlling Gold Nanoparticle Surfaces for Directed Biological Applications

2017 Fall - Chemistry

Gold nanoparticles present a promising class of materials that can be used to develop new pharmaceutical treatments for difficult-to-treat diseases such as cystic fibrosis and Alzheimer's. The ability to develop consistent surfaces on nanoparticles that are capable of selectively targeting biological materials is critical for directed pharmaceutical application development. In our research, we demonstrate new methodology that allows for production of novel surface modifications on gold nanoparticles. These results are combined with preliminary investigations into the stability and consistency of produced nanoparticles to address potential practical development challenges.

Project type: Research, Scholarship, and Entrepreneurship

142 - Arielle Rachelle Howell

Are Changes in Dietary Arginine Detectable in Feline Muscle/Hair?

2017 Fall - Biology

Production of urea is a vital component of mammalian nitrogen recycling. This cycle cannot be completed without Arginine, an amino acid most mammals can form in vivo. True carnivores, including felids, are unable to create Arginine and must have it present in their diet to properly function. If Arginine is not present, ammonia toxicity occurs. Using dietary manipulations and high-performance liquid chromatography (HPLC) we will determine if ammonia levels can be detected in feline hair and muscle samples. This will provide a less stressful, less invasive method for determining ammonia levels in wild felids, allowing managers to intervene earlier.

Project type: Research, Scholarship, and Entrepreneurship

143 - Anish Sharad Jadhav

Global Extinction Strain Rate Experiments of Single Large Hydrocarbon Fuels

2017 Fall - Mechanical Engineering

An experimental validation study of the flame extinction characteristics of large hydrocarbon fuels is carried out. A counterflow flame burner combined with a liquid fuel vaporization system is utilized at a reduced pressure of 0.84 atm to measure the diffusion flame global extinction strain rate of liquid fuels as a function of fuel dilution. A numerical study is also employed using CHEMKIN to calculate the global extinction strain rate of hydrocarbon fuels, including n-heptane, n-decane, and toluene. Flame extinction measurements of the blended fuels are compared to global flame extinction predictions using a previously published radical index methodology.

Project type: Research, Scholarship, and Entrepreneurship

144 - Sam Jalali

Regenerating Copper Sulfate from Footbaths to Prevent Heavy Metal Bioaccumulation

2017 Fall - Animal Sciences

Copper sulfate (CuSO_4) is a widely used and effective disinfectant in footbaths for dairy cows. Typically after each milking, spent footbaths are discharged into the premise lagoon. Copper (Cu) can accumulate in soil and plants in areas where the lagoon effluent is applied. We are capable of regenerating and reusing copper sulfate in the dairies.

Project type: Research, Scholarship, and Entrepreneurship

145 - Ashley Jean Janich

Detection of Permethrin Resistance in *Aedes Albopictus* from Chiapas, Mexico

2017 Fall - Microbiology, Immunology, and Pathology

It is important to characterize and understand the possible existence and mechanisms of permethrin resistance in the mosquito arbovirus vector *Aedes albopictus* due to its impact on human health. We collected mosquitoes from Chiapas, Mexico, exposed them to permethrin, and bred the survivors. We observed a lower mortality in mosquitoes from Mexico compared to the control and are currently selecting survivors to see if a decline in mortality occurs with continuous exposure. Additionally, we are analyzing DNA of the mosquitoes from Mexico for potential resistance mutations. Increased understanding of resistance in *Ae. albopictus* can potentially improve future vector control practices.

Project type: Research, Scholarship, and Entrepreneurship

146 - Andrea M. Jenney

The Influence of Tropical Pacific Weather on US Heat Waves

2017 Fall - Atmospheric Science

Long-range predictions of heat waves offer little improvement over climatology despite the continuing improvements of weather forecast models. Tropical variability in weather at sub-seasonal timescales is well-understood to influence weather in the extratropics, particularly in the winter. For this reason, it is considered a potential source of sub-seasonal predictability of weather. However, much less is understood about the tropical-extratropical connection in the summer. We show that a major climate oscillation in the tropical west pacific is significantly correlated to U.S. heat waves with long lead times, suggesting potential for use in seasonal prediction of these events.

Project type: Research, Scholarship, and Entrepreneurship

147 - Ashlie Johnson

Nutritional Analysis: Food Advertising during Children's Television Programming in Nepal

2017 Fall - Psychology

This study seeks to describe the TV food marketing landscape that children experience in the southeast Asian country of Nepal. We conducted a content analysis on 12 hours of commercials, categorizing commercials based available food nutrition information. Results show that 55% of airtime commercials during children's programming was dedicated to foods. Over 80% of the food commercials had excessive amounts of saturated fat, sugar or sodium; over half of the products that containing excess sugar.

Results from this study suggest that the media landscape in Nepal isn't meeting WHO recommendations for advertising foods to children.

Project type: Research, Scholarship, and Entrepreneurship

148 - Megan Siobhan Jones

Identifying Challenges and Supports for Women Conservation Leaders

2017 Fall - Human Dimensions of Natural Resources

Conservation science has long recognized the importance of biological diversity, but has yet to fully recognize the importance of human diversity. Although the number of women in conservation is growing, they are still underrepresented in leadership and likely face unique career challenges throughout their careers. This study explores how gender identity shapes conservation science leadership. Semi-structured interviews were conducted with over 60 women at conservation organizations in the U.S., and results were analyzed using grounded theory. From these interviews we identify the most pervasive challenges holding women back from conservation science leadership, and the most meaningful supports helping them advance.

Project type: Research, Scholarship, and Entrepreneurship

149 - Sneha Kadyan

Global Fair Trade Cotton Production, Indian Farmers and Textile Industry

2017 Fall - Sociology

Globalization in the world's economic order is critically dependent upon the confluence of economic exchange among different parts of the world. In such liberalized world economies, production for export is the key to success. However, there is lack of research on the recent developments in this sector that examine both social and environmental sustainability in how products are produced, exchanged and consumed. Assessing the impact of these global transformations, adopting an inductive approach to data analysis, I looked at fair trade textile industry with an emphasis on the internationally central, sustainable supply chain of cotton production in India.

Project type: Research, Scholarship, and Entrepreneurship

150 - Duygu Kalan

Indoor Air Quality Modeling for LEED Certified Buildings

2017 Fall - Civil and Environmental Engineering

Given that Leadership in Energy and Environmental Design (LEED) rating system can improve indoor air quality, a final testing is not required to evaluate the presence of chemicals in indoor air. Therefore, the real extent of the air quality remains unknown after occupancy for most of the buildings. The purpose of this study is to develop an indoor air quality model that predicts contaminant levels resulted from the construction materials and particularly investigate the efficiency of the "flush out" protocol. This project will contribute to body of knowledge by providing an indoor air quality model for LEED certified buildings.

Project type: Research, Scholarship, and Entrepreneurship

151 - Krystal Marie Kappeler

Philanthropic Ripple Effects in the Capitalist Market

2017 Fall - Economics

Consumers are faced with a plethora of goods and services to drive their own satisfaction, yet many consciously choose to philanthropically give their resources away. Economists disagree regarding relevant variables for an ideal empirical model of this phenomenon. This research begins with an in-depth literature synthesis investigating factors which drive philanthropy, marrying schools of economic thought and consumer behavior with a review of economic research articles, interviews, and industry reports. This study then utilizes panel data to test theoretical models and inform policy decisions, to ultimately contribute to quantifying the impact of philanthropy on the United States' capitalist market.

Project type: Research, Scholarship, and Entrepreneurship

152 - Emily Sue Johnson

Leisure or Labor?: Unveiling Constructions of Wedding Planning via Pinterest

2017 Fall - Journalism and Media Communication

This dissertation investigated how aspiring brides use Pinterest as a wedding planning tool. Drawing from in-depth interviews with 20 brides-to-be, this study addressed whether using Pinterest in this way extends the traditional feminine role of wedding preparation or provides an opportunity for women to exercise control. It was found that using Pinterest facilitates both agency and deterministic behavior. Although structural constraints such as patriarchy, hegemony, and economic factors play a role in how women experience determinism in using Pinterest, this study also found that agency is present as brides engage in meaning-making through online and offline aspects of wedding planning.

Project type: Research, Scholarship, and Entrepreneurship

153 - Courtland Kelly

Long-Term Crop Rotation Effects on Soil Macrofauna and Water Dynamics

2017 Fall - Ecology

More complex crop rotations have the potential to increase the amount and diversity of organic inputs into agricultural soils, which may have implications for soil organisms (i.e. earthworms, insects, microbes) and other important soil health parameters. We investigated a long term dryland crop rotation experiment at two locations in Eastern Colorado to test macrofauna abundance and diversity, soil structure, water infiltration, and other soil health parameters. Despite common assumptions that earthworms are not present in the area, our results indicate the presence of earthworms in these systems, and that more diverse, intense systems may support larger earthworm populations.

Project type: Research, Scholarship, and Entrepreneurship

154 - Quy Van Khuc

Bat Conservation at U Minh Thuong National Park, Vietnam

2017 Fall - Forest and Rangeland Stewardship

The population of *Pteropus vampyrus* at U Minh Thuong National Park (UMTNP), Vietnam, was 918 ± 127 observations and it tended to increase slightly in 2016-2017. The revenue of bat fertilizer contributed almost 28.7% of total local household income. A large majority (96%) of respondents committed not to catch Bat while a small proportion (4%) of respondents is willing to pay for bat conservation. WTP was influenced by average age of house head and the spouse, working years in agriculture, and income. Our results illustrated several important policy implications for bat conservation in Vietnam.

Project type: Research, Scholarship, and Entrepreneurship

155 - Tara Catherine Klinedinst

The TODAY Project: Insight into Diabetes Management and Intervention Targets

2017 Fall - Occupational Therapy

In this qualitative study, patients at a safety-net primary care clinic share perspectives related to the daily management of type 2 diabetes (T2DM). This research provides practitioners with an understanding of psychosocial impacts of T2DM management, the nature and impact of family support, and targeted areas for intervention. These targeted areas include: sustaining motivation, developing self-management routines, problem solving changes to routine, and overcoming physical and emotional barriers to exercise. The exploration of patient perspectives provides evidence for how we can more effectively intervene with people with T2DM in order to promote active engagement in self-management and decrease disability.

Project type: Research, Scholarship, and Entrepreneurship

156 - Amanda Lynn Koch

Imaging Viral-Mediated Protein Synthesis in Living Cells

2017 Fall - Biochemistry and Molecular Biology

Every year millions of people globally are infected by viruses. In part, viruses are such efficient parasites because they have evolved numerous ways that force protein production to fit their precise needs. The use of Internal Ribosome Entry Site (IRES) sequences recruit the host machinery away from host messages to a viral message. Although viral infection mechanisms have been studied for years, the protein production dynamics of viruses remain unexplored in living cells. A better-detailed understanding of these viral mechanisms could lead to discoveries of new viral inhibitory drugs that would ultimately help prevent viral infection and improve human health.

Project type: Research, Scholarship, and Entrepreneurship

157 - Jordan Tyler Koehn

Menaquinone-2 and Ubiquinone-2 Adopt Folded, U-shaped Conformations Contradicting Current Dogma

2017 Fall - Chemistry

The conformations of long polymers of isoprene units such as those found in the side-chains of lipoquinones involved in bacterial (i.e. *Mycobacterium tuberculosis*) and eukaryotic electron transport systems (ETS) have not been characterized. First, menaquinone-2 and ubiquinone-2 were synthesized then using 1H-1H 2D NOESY and ROESY NMR spectroscopy, we demonstrated that both molecules adopt a folded, U-shaped conformation in solution and within a model membrane interface. These folded conformations are in stark contrast to the extended conformations seen in literature. Folded conformations likely affect reactivity, function, and recognition within the ETS and provide insight into drug development of potent inhibitors.

Project type: Research, Scholarship, and Entrepreneurship

158 - Beth Christine Krehbiel

Genetic Structure Analysis of *Bos Taurus* and *Bos Indicus* Adaptability

2017 Fall - Animal Sciences

Genetic diversity within a population enables genetic adaptability for livestock to withstand issues that may be altering production. The objective of this research was to identify genetic structure in seven cattle breeds in relation to SNP within genes associated with high altitude disease. Cattle (n = 388) were genotyped using the BovineHD BeadChip. Single-nucleotide polymorphisms within the seven genes related to high altitude disease were queried from NCBI dbSNP database. Principle component analysis of the SNP allele frequencies related to high altitude disease revealed genetic structure exists among the seven cattle breeds due to high altitude impacts.

Project type: Research, Scholarship, and Entrepreneurship

159 - Holly Holliday Lafferty

Functional Diversity of Aquatic Macroinvertebrates along a Stream-Size Gradient

2017 Fall - College of Veterinary Medicine and Biomedical Sciences

Small streams frequently go overlooked in stream ecology but can contribute to regional biodiversity of macroinvertebrates. Headwater streams fall along a gradient of stream size, ranging from streams with widths of several meters to several centimeters. The pattern of how macroinvertebrate communities change along a subtle size gradient is not well known, especially in terms of functional traits such as feeding strategy. Macroinvertebrate communities from 15 first and second order streams in the Poudre watershed that differed in size were sampled and analyzed to see how taxon and functional diversity differs predictably along these gradients.

Project type: Research, Scholarship, and Entrepreneurship

160 - Bradley M. Lalande

Metagenomic Approaches to Determine Soil Microbial Communities Associated with Armillaria

2017 Fall - Bioagricultural Sciences and Pest Management

Armillaria root disease damage a wide diversity of forest types. Soil metagenomics and metatranscriptomics may unlock the ability to understand how soil microbial communities interact with root pathogens, which may inhibit or facilitate the pathogenicity of disease. DNA and RNA was extracted from the soil and the ITS-2 and 16S rDNA regions were sequenced using metagenomic approaches to determine the fungal and bacterial communities associated at each location. If microbial communities differ between species and tree health, this may unlock a new means of management for root diseases in a forest setting.

Project type: Research, Scholarship, and Entrepreneurship

161 - Lindsay G. Lammers

Cell Mechanics: How a Motor Protein Determine Cell Fate

2017 Fall - Biochemistry and Molecular Biology

The process of cell division, mitosis, is essential to develop different types of cells and tissues. The mechanics required for one cell to grow larger and then pinch off into two new cells is rather amazing and complex. Cells must rearrange their internal skeleton, the cytoskeleton, to help position their duplicated DNA on the axis of division. To generate forces on these structures, a motor protein dynein anchors to the cell edge and pulls on the cytoskeleton to position the DNA. My research focuses on how dynein is regulated to do this at the right place and time during mitosis.

Project type: Research, Scholarship, and Entrepreneurship

162 - Rod William Lammers

River Erosion as a Source of Water Pollution

2017 Fall - Civil and Environmental Engineering

River channel erosion may be a significant source of phosphorus pollution - a leading cause of water quality degradation in the U.S. It is still unclear, however, how much phosphorus pollution comes from river erosion compared to other sources (e.g. fertilizers). To answer this question, I developed a computer model to estimate the amount of phosphorus pollution from river erosion. The model is able to accurately estimate the magnitude of channel erosion. Next, I will apply this model to two study areas to estimate how much river erosion is degrading water quality.

Project type: Research, Scholarship, and Entrepreneurship

163 - Florent Didier Lavergne

Epicuticular Wax Variation among Tissues and Cultivars of Triticum Aestivum

2017 Fall - Horticulture and Landscape Architecture

Sustaining food crop yields is critical to ensure global food security, however yield gains are drastically inhibited by plant exposure to environmental stress. Leaf surface waxes are a critical target to breed plants for increased resistance to both biotic and abiotic stress. Here, four wheat cultivars were evaluated for variation in wax composition on leaf and stem surfaces using metabolomics and scanning electron microscopy. The data revealed significant variation in wax metabolite abundances and wax crystal microstructures among tissues and cultivars. These data support that plant breeders can incorporate wax chemistry as a novel target for resistance to environmental stress.

Project type: Research, Scholarship, and Entrepreneurship

164 - Dustin Michael Lee

SGLT2 Inhibition Improves Vascular Dysfunction in Type-II Diabetic Mice

2017 Fall - Food Science and Human Nutrition

Type 2 diabetes is a major risk factor for cardiovascular diseases and is associated with vascular dysfunction (arterial stiffness and endothelial dysfunction). A recently approved class of diabetic drugs, sodium glucose cotransporter-2 inhibitors (SGLT2i), reduce cardiovascular and overall mortality, but the specific mechanisms remain unclear. To address this question, we assessed vascular function in male diabetic and control mice treated with or without SGLT2i. Diabetic mice receiving SGLT2i exhibited reduced arterial stiffness and improved endothelial function. These results were accompanied by improved glucose tolerance and reduced inflammatory markers. Thus, SGLT2i may exert beneficial effects via improved vascular function.

Project type: Research, Scholarship, and Entrepreneurship

165 - Sarah I. Leichty

Does Residue Placement Affect Soil Carbon Dynamics in Irrigated Corn?

2017 Fall - Ecology

Soil carbon sequestration is a strategy to mitigate greenhouse gas emissions while enhancing microbial processes and water retention. Agricultural practices that leave surface residue undisturbed have been promoted to sequester more C. However, recent work shows a redistribution of C rather than an increase when the entire soil profile is measured. This project will determine if surface application or incorporation (10 cm) stabilizes more residue throughout the soil profile (100 cm) using carbon stable isotope-labeled residue in a sprinkler-irrigated corn system in Colorado.

Project type: Research, Scholarship, and Entrepreneurship

166 - Lance Christopher Li Puma

FADS2 Overexpression Exacerbates Myocardial Injury in Mice: Role of Mitochondria

2017 Fall - Biomedical Sciences

Common FADS2 haplotypes associated with hyperactivity of its gene product predict cardiovascular morbidity and mortality in humans. To investigate this, we generated mice with global transgenic overexpression of FADS2. When challenged with global ischemia-reperfusion-injury, FADS2-tg hearts have greater infarct sizes compared to WT. We hypothesized that FADS2 might exacerbate injury by altering mitochondrial responses to ischemia-reperfusion. Mitochondria were isolated from FADS2-tg or WT hearts for studies following ischemia-reperfusion. FADS2-tg-I/R mitochondria exhibited lower ADP-stimulated-respiration and increased Ca²⁺-induced-swelling, suggesting impaired cardiac energetics following ischemia. Ongoing studies in our laboratory are investigating mitochondrial phospholipases signaling, mitoBKCa and mitoKATP channel activity in ischemia-reperfusion injury.

Project type: Research, Scholarship, and Entrepreneurship

167 - Katherine Jai Li

Plasma Metabolome of Children with Elevated Cholesterol and Cardiovascular Risk

2017 Fall - Environmental and Radiological Health Sciences

Emerging evidence suggests that key metabolites in blood serve as novel biomarkers for hypercholesterolemia and cardiovascular disease (CVD). We aimed to examine correlations between serum lipid levels and plasma metabolites in 38 healthy, school-aged children with risk factors for CVD. Forty-five plasma metabolites were found to be strongly correlated with serum total, LDL-, HDL-cholesterol, and triglycerides ($r_s \geq 0.6$; $p \leq 0.001$), including sterols, diacylglycerols, 3-hydroxybutyrate, tryptophan, and homoarginine, which have been associated with cardiometabolic and atherosclerotic risk in adults. Verification of metabolite profiling and modifiable risk factors in epidemiological studies will assist with early CVD detection and intervention to mitigate disease risk.

Project type: Research, Scholarship, and Entrepreneurship

168 - Nicole S. Litwin

Potential of Blueberries for Improving Endothelial Dysfunction in Postmenopausal Women

2017 Fall - Food Science and Human Nutrition

Postmenopausal women have an increased cardiovascular disease risk largely due to vascular endothelial dysfunction. Previous research suggests that blueberries may improve endothelial function. This randomized, double-blind, placebo-controlled, parallel-arm clinical trial is investigating whether daily blueberry consumption can improve endothelial function in postmenopausal women with elevated blood pressure, as well as potential underlying mechanisms. A total of 58 women aged 45-65 years with pre- or stage 1-hypertension will be randomized to receive either 22 g/d freeze-dried blueberry powder or placebo-control powder for 12 weeks. We expect that 12 weeks of blueberry consumption will improve endothelial function compared to placebo-control.

Project type: Research, Scholarship, and Entrepreneurship

169 - John Jun Long

Interaction of Free-Living Moeba with Rice Pathogen *Xanthomonas Oryzae*

2017 Fall - Bioagricultural Sciences and Pest Management

Xanthomonas oryzae are devastating bacterial pathogens of rice, in which no durable, broad-spectrum means of control currently exist. To understand how pathogen survival in the phytobiome is influenced by free-living amoeba (FLA), and the potential for FLA as a biocontrol, we explored their interactions. Co-cultivation of *X. oryzae* with FLA caused a depletion in bacteria over time. However, confocal microscopy excluded amoebic phagocytosis as the method of bacterial antagonism. Instead, our findings suggest amoebae secrete a bacteriolytic compound. This work establishes novel dynamics between important plant pathogens and diverse amoeba species, laying the groundwork for future mechanistic studies.

Project type: Research, Scholarship, and Entrepreneurship

170 - Hannah Beth Love

The Importance of Mentoring for Interdisciplinary Scientific Teams

2017 Fall - Sociology

Scientists often work on interdisciplinary research teams where they combine knowledge in new and interesting ways to solve pressing scientific problems. However, combining knowledge across disciplines is a challenge! At Colorado State University for over 2-years we have followed 14 interdisciplinary research teams to study the science of team science. Literature reports that successful teams have three characteristics: even turn-taking, social sensitivity, and percentage female. In our case-study, successful teams have also demonstrated mentoring. The poster will focus on how understanding the process of team formation, including the role of mentoring creates better scientific teams.

Project type: Research, Scholarship, and Entrepreneurship

171 - Jared James Luxton

Telo-dGH: Personalized Diagnosis for Radiation Sensitivity and Secondary Cancer Risk

2017 Fall - Cell and Molecular Biology

Prospective clinical means for determining radiation sensitivity and secondary cancer risk for cancer patients of radiation therapy don't exist. Patient sensitivity to radiation incurs radiation late effects, which range in severity from minor (fatigue) to severe (heart complications, infertility), and even secondary malignancy as a consequence of the radiation therapy. We developed an assay, Telo-dGH, and are validating its use for determining radiation sensitivity and secondary cancer risk in radiation therapy patients. We are currently working with prostate cancer patients. Telo-dGH could enable: more personalized and better informed decisions for treatment, but also monitoring of secondary malignancies in cancer patients.

Project type: Research, Scholarship, and Entrepreneurship

172 - Jeffrey Ma

Impurity Phase Effects on the Electrochemical Performance of Electrodeposited SnSb

2017 Fall - Chemistry

In order for next generation applications, such as all-electric vehicles, to be more viable, higher charge storing materials are desirable. In this study, electrodepositions of SnSb were performed, where purity, particle size, and thickness of the material were tuned based on multiple conditions. Electrochemical testing of SnSb in lithium- and sodium- ion batteries suggests promising performance and cycle life of the material. Non-pure SnSb phase samples were also synthesized to show the importance of purity of the synthesized electrodes, and how purity of the material can affect the cyclability of the anode material.

Project type: Research, Scholarship, and Entrepreneurship

173 - Aaron Mark Magnuson

Prolonged HFD Feeding is Associated with Visceral Lymph Node Fibrosis

2017 Fall - Food Science and Human Nutrition

Visceral adiposity is associated with increases in co-morbidity and disease incidence due to increased inflammatory potential. We propose pro-inflammatory conditions in visceral adipose tissue alter lymph node architecture and cell subsets resulting in exacerbated inflammation and altered immune function. We utilized mice fed high fat or CHOW diet to investigate lymph node micro-architecture and immune cells potentially altering immune function. We demonstrate 7 weeks HFD induces inflammation in adipose tissue and expansion of lymph node immune populations. At 13 weeks significant fibrosis of the lymph node is associated with significantly decreased viable immune cells.

Project type: Research, Scholarship, and Entrepreneurship

174 - Gunjan Shrikrishna Mahindre

Reconstruction of Large Scale Networks from Partial Information

2017 Fall - Electrical and Computer Engineering

Graph mining is an important problem applicable to many areas, including social networks and IoT. By representing nodes of graphs using Virtual Coordinates (VC), which are shortest hop-distances of nodes from a small set of anchor nodes, we have developed techniques for representing graphs in a compressed form, but extract important connectivity information. Properties of VC based representation are derived and synthesis techniques are developed to regenerate a graph from this partial information. The results will change the way we store graphical data and open new possibilities in areas such as chemistry, social networks and the ever evolving Internet.

Project type: Research, Scholarship, and Entrepreneurship

175 - Michelle Nichole Mann

Antibacterial Coatings Fabricated from Essential-Oil Components via Plasma Processing

2017 Fall - Chemistry

Polymers used in environmental and biomedical applications (e.g., filtration membranes and wound dressings) have surface properties that limit their biocompatibility and performance in biological settings. Such limitations arise from material hydrophobicity and propensity for bacterial attachment, leading to infection and device failure. Here, plasma processing is used to deposit films derived from essential-oil derived compounds. Surface characterization and performance testing reveals deposited films are anti-fouling and have controllable surface properties. As the use of polymers is widespread in biomedical devices and water treatment, such tunability allows for development of advanced naturally-derived antibacterial coatings, potentially improving medical outcomes and water quality.

Project type: Research, Scholarship, and Entrepreneurship

176 - Diego Ignacio Manriquez Alvarez
Intrauterine Infusion of Oregano Extract Produces Carvacrol Milk Residues
2017 Fall - Animal Sciences

The presence of Carvacrol milk residues after prophylactic intrauterine infusion of UterFlush® (UF) on post-partum dairy cows was analyzed. Milk samples from five Holstein cows treated with UF applied every other day for three times were collected into two sampling schemes: (1) at 0, 6, 12, 24 and 48 h after the first treatment; (2) at 6, 12, 24 and 48 h after the last treatment. Average concentrations were 0, 0.217, 0.084, 0.005 and 0 ppm (scheme 1), and 0.097, 0.089, 0.041 and 0.001 ppm (scheme 2). These results indicate the presence of Carvacrol followed by UF administration.

Project type: Research, Scholarship, and Entrepreneurship

177 - Mary Elizabeth Marisa
Understanding the Crystallization Pathway of Synthetic Bone Mineral
2017 Fall - Chemistry

Many biominerals formed in aqueous media, such as those found in bone, are synthesized via metastable or amorphous precursors. Crystallization pathways can be dependent on the species initially present in solution and other chemical factor such as pH. Bone mineral is of importance because of the medical implications in connection with various bone tissue diseases. Understanding the pathway through which biomimetic bone mineral is formed may inform targets for bone disease or improve processing for synthetic grafting materials. Here, the crystallization of biomimetic bone mineral is monitored to determine the precursor phases and factors which influence the rate of crystallization.

Project type: Research, Scholarship, and Entrepreneurship

178 - Frank Wayne Marrs
Latent Influence Networks in Global Environmental Politics
2017 Fall - Statistics

State decisions in environmental policy are driven by international factors, but systematic assessment of this influence has proven elusive. For the first time, we examine the latent influence network that underlies global politics. We propose a model for longitudinal bipartite relational data to infer latent influence networks. Our approach provides improved interpretability and estimability over existing models while performing at least as well. We analyze a newly compiled dataset and find that strong positive and negative influences among countries and treaties do exist. These findings provide a means to understand the evolution of international environmental protection.

Project type: Research, Scholarship, and Entrepreneurship

179 - Craig Anthony Marshall
Integrated Physiological Correlates of Osmoregulation in Trinidadian Swamp Guppies
2017 Fall - Biology

Euryhaline fish can tolerate a wide range of salinities. However, the extent to which populations can tolerate different salinity levels through plasticity versus adaptation remains underexplored. Circulating plasma cortisol levels and metabolic rates are involved in both osmoregulation and stress responses. Thus, the use of such physiological measures to distinguish local adaptation from adaptive plasticity is complicated. Here, we investigated the effects of salinity on field plasma cortisol levels and oxygen consumption in swamp guppies from the island of Trinidad. Collectively, our results suggest the degree of environmental variability in salinity shapes plastic and evolved physiological responses of populations.

Project type: Research, Scholarship, and Entrepreneurship

180 - Lindsey Anne Marshall

Improved Fee Structure for Marine Managed Areas in the Caribbean

2017 Fall - Human Dimensions of Natural Resources

Marine Managed Areas (MMAs) in the Caribbean are important for eco-tourism revenue generation, as well as many cultural and economic benefits derived from marine ecosystems. MMAs in Grenada and St. Vincent and the Grenadines are underfunded, understaffed, and therefore suffer from inadequate law enforcement and conservation management. Our team researched current fees, willingness to pay studies, and the value of ecosystem services to create presentations and policy briefs informing policy-makers about opportunities to increase MMA fees. Increasing fees will generate more income for the countries as well as optimize opportunities for better management, training, and infrastructure in these important areas.

Project type: Research, Scholarship, and Entrepreneurship

181 - Kira Lee Marshall-Mckelvey

(Lip)stick it to the Man: Feminist Rhetorical Moves on YouTube

2017 Fall - English

"(Lip)stick it to the Man: Feminist Rhetorical Moves on YouTube" explores the tensions between traditional notions of feminism and beauty videos. My project seeks to identify ways beauty gurus use feminist narrative and invitational rhetoric in order to empower their target audiences, and to challenge limited notions of feminism. In using close textual analysis of two popular beauty gurus' videos, I code for inclusive rhetoric and storytelling that aligns with contemporary feminism. My findings about the agentive role viewers have in shaping feminist discourse have online point to future studies that focus on audience-rhetor discourse.

Project type: Research, Scholarship, and Entrepreneurship

182 - Ellen Claire Martin

Shorebird Use of Military Lands in Interior Alaska

2017 Fall - Fish, Wildlife and Conservation Biology

Shorebird populations are declining globally and little is known about the use and distribution of breeding species in interior Alaska. We fill this information void by estimating shorebird use of military lands in interior Alaska on Tanana Flats and Donnelly Training Areas. We conducted surveys to (1) identify shorebird species using military lands, and (2) create occupancy/use models and determine associated habitat covariates. We predict that shorebirds would use open shrub and wet grassland habitats. We surveyed 203 plots (400x400 m) twice over 2 field seasons. We will present correlations of use with habitat variables derived from occupancy/use models.

Project type: Research, Scholarship, and Entrepreneurship

183 - Jon Martinez

Diagnosing the Rapid Intensification of Hurricane Patricia (2015) from Observations

2017 Fall - Atmospheric Science

Hurricane Patricia (2015) made history as the strongest tropical cyclone in the western hemisphere with a peak intensity of 185 knots. Patricia set various records, with the most noteworthy being its unprecedented rapid intensification of 105 knots in 24 hours. Although this dramatic intensification was not well captured by forecast models, high-resolution observations gathered by aircraft penetrating the eye of Patricia allow for a thorough investigation of the mechanisms that may have contributed to its evolution. Preliminary results suggest that Patricia's ability to efficiently concentrate convection in a remarkably narrow annulus surrounding the eye led to its rapid intensification.

Project type: Research, Scholarship, and Entrepreneurship

184 - Marco Antonio Martinez

Tactile Waves - An Android Software Library for Sensory Substitution

2017 Fall - Mechanical Engineering

Many who suffer from hearing impairment are left with few treatment options due to the type/severity of their condition, as well as financial and medical hurdles of surgical methods and implanted devices (i.e. cochlear implants). Sensory substitution provides an affordable, non-invasive treatment to a broad spectrum of sensory impairments. The Tactile Waves software package will aid and accelerate the design, development, and commercialization of such devices. DSP techniques and supporting infrastructure will be implemented and tested, prior to the development of neural networks for audio classification. The library will be published and maintained through a GitHub repository.

Project type: Research, Scholarship, and Entrepreneurship

185 - Matthew George Marzo

Yeast as a Screening Platform to Understand Muscular Dystrophy Diseases

2017 Fall - Biochemistry and Molecular Biology

Human genetic diseases can emerge from spontaneous mutations that are acquired during development. Mutations in genes important for neurological development can give rise to a spectrum of muscular dystrophies, including Charcot-Marie-Tooth syndrome and SMA-LED. The identities of dozens of mutations that are causative of these diseases have been linked to mutations in the human dynein gene. Limited information about the effect of these mutations is available, and studying these diseases in humans remains prohibitively difficult. To overcome these challenges, we have developed a budding yeast-based system to assess the genetic contribution of human mutations to dynein function.

Project type: Research, Scholarship, and Entrepreneurship

186 - Annalise Elizabeth Maughan

Octahedral Tilting from Organic Cations in Defect-Ordered Hybrid Perovskites

2017 Fall - Chemistry

Perovskite semiconductors are a technologically-relevant family of materials for applications in low-cost photovoltaics, yet materials such as methylammonium lead iodide present significant concerns for toxicity and material stability. Defect-ordered perovskite derivatives offer improved toxicity and stability outlooks. We have prepared the perovskite materials Cs_2SnI_6 , $(\text{CH}_3\text{NH}_3)_2\text{SnI}_6$, and $(\text{CH}(\text{NH}_2)_2)_2\text{SnI}_6$. While Cs_2SnI_6 exhibits moderate electronic conductivity, incorporation of CH_3NH_3^+ and $\text{CH}(\text{NH}_2)_2^+$ reduces carrier mobility across the series. We correlate the trends in mobility with increasing disorder of the SnI_6 environment across the series. These studies provide insight into the fundamental properties of a class of materials for applications in emerging solar energy technologies.

Project type: Research, Scholarship, and Entrepreneurship

187 - Skyler Pendleton Mavor

Geologic Map of the Maltby 7.5-Minute Quadrangle, Washington

2017 Fall - Geosciences

We present a new geologic map of the Maltby 7.5' quadrangle at 1:24,000 scale. The densely populated quadrangle located 30km NE of Seattle, which has not been mapped in detail since the 1980s, spans the projected intersections of several active regional tectonic structures. We support the map with new field work, lidar, existing subsurface explorations, geochemistry, palynology, and U-Pb, luminescence, radiocarbon, and biostratigraphic chronology. We compare mapped geology with new isostatic gravity and existing aeromagnetic data for further observations of structural features in this complex area.

Project type: Research, Scholarship, and Entrepreneurship

188 - Shelby C. McClelland

Soil Carbon Dynamics in Perennial Grasslands under Various Management

2017 Fall - Ecology

Grassland ecosystems offer enormous potential to sequester and store carbon given their large global land area. However, due to conversion into arable cropland, mismanagement, and degradation these systems remain limited in their capacity to serve as a carbon sink. Improved management of grassland ecosystems via organic amendment addition and management-intensive grazing can enhance soil carbon stocks and the economic viability of these systems. In this study, we hypothesize that a single application of a composted organic amendment combined with management-intensive grazing at similar sites across the Colorado shortgrass steppe will increase short-term NPP and overall carbon input and storage.

Project type: Research, Scholarship, and Entrepreneurship

189 - Marie C. McGraw

New Insights on Arctic-Midlatitude Dynamics and Feedbacks from Causal Discovery

2017 Fall - Atmospheric Science

The rapid warming of the Arctic and its potential impacts on midlatitude weather and climate dynamics have recently become of great interest to the scientific community. Currently, there is much debate regarding the role the Arctic plays in driving the midlatitude circulation, and vice versa. We gain new insights on Arctic-midlatitude dynamics and feedbacks by applying Granger causality to autoregression models, allowing for quantification of feedbacks that can be consistently applied across various data sets, allowing for a clean comparison of model results and observations, and for assessment of the role of internal variability in masking smaller signals.

Project type: Research, Scholarship, and Entrepreneurship

190 - Katy Elizabeth McIntyre

A Friend between Enemies: Cytokinins as New Broad-Spectrum Pesticide

2017 Fall - Bioagricultural Sciences and Pest Management

In plants, the signaling pathways controlling defense responses against attack by pathogens and insects are controlled by plant hormones. While the salicylic acid pathway protects against biotrophic pathogens, the jasmonic acid pathway protects against necrotrophic pathogens and insects. Because these two pathways are antagonistic to each other, pesticides currently used in agriculture can provide protection against either biotrophic pathogens or necrotrophic pathogens and insects. Here I show that another plant hormone, cytokinin, can activate both pathways, and provide protection against a broad spectrum of pathogens, indicating their potential as highly valuable new agrochemicals.

Project type: Research, Scholarship, and Entrepreneurship

191 - Clifton Dyer Mckee

Timing the Diversification of a Mammal Parasite, Bartonella

2017 Fall - Ecology

Most human infectious diseases have origins in other animal species. Estimating when infectious microbes evolved will help us understand their ability to specialize on a broad range of host species. Using Bayesian phylogenetic techniques, I determine that the bacterial genus Bartonella, a parasite of mammals globally, emerged as a gut symbiont of arthropods 100-200 million years ago. It then diversified after transitioning to a parasitic lifestyle targeting mammals and using blood-feeding ectoparasites as vectors during the Cretaceous, 79-145 million years ago. Other microbes may be equally old and may reflect a general trend in the evolution of modern diseases.

Project type: Research, Scholarship, and Entrepreneurship

192 - Ian Cook McLean

3D-Printed Microfluidic Device for the Analysis of Intestinal Tissue

2017 Fall - Biomedical Engineering

Currently, most in vitro experimental models of the intestine rely upon cell lines, and consequently, lack the diverse representation of cells present in vivo. Slices of intestine, removed from living organisms, offer a better representation of in vivo physiology. However, current techniques for maintaining intestinal tissue in vitro are not capable of recapitulating the in vivo environment. This project utilizes 3D printing and microfluidic principles to design a device that delivers differential flows of media across the two surfaces of intestinal tissue. The device will enable the investigation of complex biological questions that previous models have been unable to address.

Project type: Research, Scholarship, and Entrepreneurship

193 - Catie G. McVey

Facial Biometrics as Non-Invasive Predicators of Dairy Health Traits

2017 Fall - Animal Sciences

In 2016, genomic tests for dairy health traits became commercially available in the US. This technology represents a powerful tool for improving cow longevity and wellbeing, but isn't cost-effective for many herds. The purpose of this project was to determine if facial biometrics could effectively estimate these genomic health values. Photos and breeding value estimates of elite dairy bulls were web-scrubbed from Accelerated Genetics online catalogue, and facial biometrics were extracted using custom machine vision algorithms. Facial biometrics accounted for >50% of the variability in milk yield, longevity, and fertility traits, and over 30% of the variability in health traits.

Project type: Research, Scholarship, and Entrepreneurship

194 - Sachintha Sarani Mendis

Estimating Demand for Food Quantity and Quality in Urban China

2017 Fall - Agricultural and Resource Economics

It's been well documented that food consumers in China have undergone major dietary changes recently. While most research effort has been devoted to the analysis of quantity response to the changing economic environment, the quality aspect of food consumption has received relatively scant attention. This study modifies an existing analytical framework (Linear Approximate Exact Affine Stone Index system) to empirically examine consumer demand for food quality in China while accounting for the effects of observed and unobserved regional heterogeneity on demand for food quality. The major findings indicate that relatively more affluent provinces have a higher affinity for food quality.

Project type: Research, Scholarship, and Entrepreneurship

195 - Brian Anthony Mitchell

Fruit Cluster Pruning in Organic High Tunnel Tomato Production

2017 Fall - Horticulture and Landscape Architecture

This research project examines the impact of fruit cluster pruning on three cultivars of tomato grown organically within a high tunnel. Each plant was trained to have a single leader. Two cluster pruning treatments and a control were used to study the effects on limiting fruits per cluster on yield, marketability, and quality. The experiment was replicated twice, in 2016 and 2017, at Colorado State University's certified organic farmland located at ARDEC South. First-year data suggests that cultivar selection, rather than cluster pruning treatments, is a more important factor when considering total and marketable fruit yield and indicators of quality.

Project type: Research, Scholarship, and Entrepreneurship

196 - Dominique Francesca Montano

New Depths: Lipid Influences on Aerobic Capacity in Marine Mammals

2017 Fall - Biology

Marine mammals are capable of diving to extreme depths for long periods. This ability to exercise under low oxygen conditions has sparked questions about mechanisms promoting such extraordinary aerobic capacity. Their high-fat diet has been suggested to contribute to their diving ability, and any specific types of lipids that affect the expression of the oxygen-binding protein myoglobin (found at concentrations ten times that of terrestrial mammals) and thus the impressive aerobic capacity of these divers has not been studied. This inquiry into nutritional influences on the diving physiology of marine mammals could elucidate mechanisms contributing to exercise performance in mammals.

Project type: Research, Scholarship, and Entrepreneurship

197 - Shea Graeme Moore-Farrell

Modeling Carbon Metabolism for Improved Drought Tolerance in Crops

2017 Fall - Cell and Molecular Biology

Plants remove CO₂ from the atmosphere and incorporate carbon into a diverse array of biological molecules through photosynthesis. These molecules perform all functions required for plant survival, including the response to abiotic stresses like drought. C₄ plants have evolved a unique mechanism of carbon distribution which improves the efficiency of photosynthesis while under drought conditions. Through metabolomics and computational flux analysis, we are developing a system-wide model that represents the rate carbon flows to important molecules in the C₄ crop Sorghum. This model can be utilized to develop novel metabolic engineering strategies for improved drought tolerance in plants.

Project type: Research, Scholarship, and Entrepreneurship

198 - Samantha Mosier

Soil Organic Matter from Southern Pine Biofuel Feedstocks

2017 Fall - Ecology

Using pre-commercial thinnings in pine plantations has the potential to deliver sustainable biofuels. However, the removal of biomass from these plantations could reduce C inputs belowground and overall C storage. This study analyzes soil C and N stocks to estimate stock changes, as a function of soil type and different management systems. Soil cores were taken from 12 different southern pine plantations, representing 4 different soil types. Each site had 2 silvicultural regimes across 3 levels of pre-commercial thinning. Soils were separated into meaningful fractions to understand how much soil organic matter is bioavailable and how much is stabilized.

Project type: Research, Scholarship, and Entrepreneurship

199 - Haley Elizabeth Moss

Dynamic Profiles of Health Habits in Children: What, Where, When

2017 Fall - Health and Exercise Science

In America, one in five children are overweight or obese by five years of age. By the time obese children reach adulthood, obesity suppressing and promoting habits could be set and hard to change. We looked to see at what age these habits begin to form using a survey based study of children enrolled in the Youth Sport Camps run by the Department of Health and Exercise Science at CSU. Determining the age of habit development will allow us to create effective interventions targeting this critical period that deter or prevent the onset of obesity.

Project type: Research, Scholarship, and Entrepreneurship

200 - Sanli Movafaghi

Hemocompatibility of Superhemophobic Titania Surfaces

2017 Fall - Mechanical Engineering

Despite the biocompatibility of titanium-based implants, when these implants come in contact with blood, platelet adhesion/activation occur, which may lead to further thrombosis and sometimes failure of these implants. In this work, for the first time, we investigated the blood platelet adhesion and activation of truly superhemophobic surfaces and compared them with that of hemophobic surfaces and hemophilic surfaces. Our results indicate that superhemophobic surfaces display significantly lower platelet adhesion and activation and so an improved hemocompatibility compared to hemophobic and hemophilic surface. We envision this simple and scalable fabrication technique will lead to improved hemocompatible, superhemophobic medical implants.

Project type: Research, Scholarship, and Entrepreneurship

201 - Eve Madaline Mozur

Understanding Dynamics to Elucidate the Electronic Properties of Hybrid Perovskites

2017 Fall - Chemistry

Hybrid perovskites are exciting new materials for use in solar cells, but their materials properties are not well understood. Unlike traditional semiconductors, which are either organic or inorganic, hybrid perovskite semiconductors are composed of an inorganic framework (PbBr_3^-) coupled to isolated organic cations (CH_3NH_3^+). To probe how the presence of an organic cation changes the behavior of an inorganic framework, we have characterized the structure, dynamics, and electronic properties of the series with the chemical formula $(\text{CH}_3\text{NH}_3)_{1-x}\text{Cs}_x\text{PbBr}_3$. Our results elucidate the complex interactions in hybrid perovskites, a deep understanding of which is necessary to enable technological innovation.

Project type: Research, Scholarship, and Entrepreneurship

202 - Rebecca Malaika Much

Quantifying the Effects of Non-Lethal Tools on Wolf Behavior

2017 Fall - Fish, Wildlife and Conservation Biology

Human-carnivore conflict is on the rise as human populations grow and carnivore conservation gains precedence. Conflict behaviors exhibited by carnivores are often learned; therefore, reducing learning potential with non-lethal tools is important for coexistence. We measured how prior experience influenced the motivation and persistence of captive wolves (*Canis lupus*) seeking food rewards by quantifying latency and duration of key behaviors. Our results indicated that wolves showed increased motivation with prior experience and decreased persistence with the application of effective non-lethal tools. Overall, this study demonstrates that non-lethal tools can effectively curb learning in carnivores and help reduce human-carnivore conflict.

Project type: Research, Scholarship, and Entrepreneurship

203 - Subhojeet Mukherjee

In-Vehicular Communication Security for Heavy Duty Vehicles

2017 Fall - Computer Science

Inside today's vehicles, embedded electronic control units (ECUs) manage different operations by communicating via the serial CAN bus. It has been shown that the CAN bus can be accessed by remote attackers to disrupt/manipulate normal vehicular operations. Heavy-duty vehicles, unlike their lighter counterparts, follow a common set of communication standards (SAE J1939) and are often used for transporting critical goods, thereby increasing their asset value. This work deals with the internal communication security of heavy-duty vehicles and is aimed at detecting/preventing malicious activities that can adversely affect human lives and company fortunes reliant on such modes of transportation.

Project type: Research, Scholarship, and Entrepreneurship

204 - Emily Anna Mariah Mulawa

Endocannabinoid Concentrations Change between Active and Hibernating Marmot (*Marmota flaviventris*)

2017 Fall - Biomedical Engineering

Hibernators make ideal model organisms for studying diseases such as obesity and osteoporosis. These animals increase fat stores to almost double body mass and become inactive for extensive periods of time without experiencing negative effects. The endocannabinoid system is involved in regulating homeostasis of many processes including immunosuppression, appetite, thermogenesis, and bone and energy metabolism. This study aims to understand involvement of the endocannabinoid system in regulating physiological processes during hibernation by quantifying endocannabinoid ligands in both active and hibernating marmots. Findings of significant tissue-specific changes in ligands with hibernation suggest a peripherally controlled suppression in bone and energy metabolism.

Project type: Research, Scholarship, and Entrepreneurship

205 - Cary Mundell

Novel RNA Domains in Diverse Virus Families that Stall XRN1

2017 Fall - Cell and Molecular Biology

XRN1 is a major 5'-3' exonuclease involved in the turnover of eukaryotic mRNA. Members of the Flaviviridae (e.g. Bovine Viral Diarrhea Virus, Hepatitis C Virus) family possess a knot-like structure in their untranslated regions (UTR) that is used to stall/repress XRN1 activity. We have previously shown that members of other virus families, specifically Bunyaviridae (Rift Valley Fever Virus), could possess a different structure, a G-quadruplex, for the stalling of XRN1. Mapping of the minimal sequence necessary for the stalling of XRN1 in these virus UTRs is essential to understanding this pathway for successful virus replication.

Project type: Research, Scholarship, and Entrepreneurship

206 - Rob Vincent Musci

The Dunkin-Hartley Guinea Pig as a Novel Model for Sarcopenia

2017 Fall - Health and Exercise Science

Sarcopenia, age-related muscle loss, impairs health in older adults. The purpose of this investigation was to characterize age-related changes in skeletal muscle in Dunkin-Hartley (DH) guinea pigs to evaluate their potential as a model of accelerated skeletal muscle aging. We observed decreased muscle protein synthesis in 15mo DH guinea pigs compared to 5mo, but not in controls guinea pigs. We observed a shift to smaller myofiber size in 15mo DH. Altogether, DH guinea pigs demonstrated characteristics of age-related sarcopenia by 15mo. Thus, DH strain might be an efficacious, non-transgenic model of accelerated aging that could be used to study sarcopenia.

Project type: Research, Scholarship, and Entrepreneurship

207 - Madison Taylor Myers

The Transformation of Perception Surrounding Mental Illness to Empower Women

2017 Fall - English

The woman's psychotic break is typically perceived as the character's downfall or final blow within an oppressive and marginalizing society. Perceptions of mental illness changed, however, as women of the late 19th and early 20th centuries began utilizing mental illness as a way to break free from the constraints of a limiting, patriarchal society. When something that would typically be seen as a struggle, is used as a form of empowerment, possibilities for marginalized voices become available. Thus, the shift from mental illness being a destructive downfall to a freeing form of empowerment created new space for marginalized female voices.

Project type: Research, Scholarship, and Entrepreneurship

208 - Alexandra Claire Naegele

Connecting Clouds, the Hydrologic Cycle, and the Atmospheric Energy Budget

2017 Fall - Atmospheric Science

Globally, precipitation is constrained by atmospheric radiative cooling (ARC), but on regional scales, the ARC and precipitation are inversely related. We use observational precipitation and radiative flux data to investigate the effects of clouds on the ARC as well as the seasonal and interannual covariability of precipitation and the ARC. To further investigate the effects of clouds on this relationship, we use a cloud-resolving model to explore the relationship between precipitation and the ARC within the context of convective self-aggregation.

Project type: Research, Scholarship, and Entrepreneurship

209 - Kyle Matthew Nardi

Assessing Numerical Weather Prediction Models in Forecasting Atmospheric Rivers

2017 Fall - Atmospheric Science

Atmospheric rivers (ARs), narrow corridors of high atmospheric water vapor transport, are a major source of wintertime precipitation for the western coast of the United States. While these features can help to alleviate drought conditions, they can also cause damage to infrastructure and lead to flash flooding. As a result, skillful operational forecasting of ARs is desired. This study examines the performance of 9 state-of-the-art numerical weather models through the lens of forecasting atmospheric rivers for the western coast of North America. Differences in predictive skill between models and geographical regions are highlighted.

Project type: Research, Scholarship, and Entrepreneurship

210 - Gerardo Ezequiel Narez

Efficacy of P188 in Saving Meniscal Chondrocytes Following Impact

2017 Fall - Biomedical Engineering

Following anterior cruciate ligament tear, reconstruction surgery of the ligament is the gold standard to return stability to the knee and reduce the risk of developing osteoarthritis. However, a few years after reconstruction surgery, patients begin to show signs of osteoarthritis. One aspect currently not explored in reconstruction surgery is the acute damage to the cells of the soft tissues of the traumatized joint. The ability to pair reconstruction surgery along with acute pharmacological intervention early post trauma can improve the efficacy of surgical reconstruction preventing the development and progression of osteoarthritis.

Project type: Research, Scholarship, and Entrepreneurship

211 - Afnan Shazwan Bin Nasaruddin

Comparison of Primers for Dickeya Detection in Seed Potatoes

2017 Fall - Bioagricultural Sciences and Pest Management

The 2015 blackleg outbreak in the United States prompted the molecular testing of seed potatoes prior to planting to detect the presence of *Dickeya dianthicola*. PCR-based detection assays are available, but they were not validated with the North American strains. We tested five different PCR-based detection assays: a) multiplex (Pcc, Pba, Pwa and Dsp primers); b) ECH; c) DIA-A; d) DIA-C; and e) PeIADE assays on at least 115 stem and 240 tuber samples. Both the PeIADE and DIA-C primers gave the most consistent results. Our results show that there is a need for improved diagnostic assays for *Dickeya* detection.

Project type: Research, Scholarship, and Entrepreneurship

212 - Nora Jean Nealon

Fractionation of Probiotic-Fermented Rice Bran to Identify Salmonella-Inhibitory Compounds

2017 Fall - Environmental and Radiological Health Sciences

Salmonella infects millions annually and increasing antimicrobial resistance warrants alternative therapeutics. One approach involves rice bran, which enhances gut-native Lactobacillus production of antimicrobials. The current objective was to fractionate cell-free supernatant from probiotic fermented rice bran and examine fractions for Salmonella growth suppression. Our hypothesis was that supernatant contained multiple fractions that reduced Salmonella growth compared to a supernatant-free control. With Lactobacillus fermentum, we identified three fractions suppressing Salmonella growth between 8-24h, during mid/late exponential phase. Future studies will profile and quantify compounds in bioactive fractions and can potentially be used to prevent and treat Salmonellosis in humans and animals.

Project type: Research, Scholarship, and Entrepreneurship

213 - Braden Neihart

Health and Nutrition: Understanding Ale in Medieval Monastic Life

2017 Fall - History

Pulling from modern chemistry, archeology, history, and monastic rules, this study seeks to bring to light medieval monks understanding or appreciation of the nutritional benefits of consuming ale. In restricting the study to monasteries in Northern and Western Europe, it will allow for a deeper focus into the monasteries that relied on ale rather than wine. The driving goal is to research the implications of "bread and water" as a punishment that signifies more than a bland diet, but instead punishes wayward monks with an insufficient nutrients that had potential for grave consequences.

Project type: Research, Scholarship, and Entrepreneurship

214 - Megan Judith Neufeld

Next Generation Biomaterials: Potential Clotting Prevention of Metal-Organic Frameworks

2017 Fall - Chemistry

Blood-contacting devices fabricated from polymers may cause clotting due to platelet adhesion and activation. This phenomenon can result in serious medical complications. We present an approach to mitigate clotting using crystalline materials known as metal-organic frameworks (MOFs). Through inclusion of MOFs within medically-relevant polymers, new materials have been developed that produce the anti-clotting agent nitric oxide (NO) directly from biomolecules present in blood. In vivo blood studies indicate both decreased platelet adhesion and clotting time that is attributable to the presence of MOFs, suggesting that these MOF-based materials are attractive candidates for improving medical care.

Project type: Research, Scholarship, and Entrepreneurship

215 - CJ Janel Nezat

Determining Fate and Transport of Cyanotoxins in the Environment

2017 Fall - Civil and Environmental Engineering

Global presence of cyanotoxins has brought attention to the risks that are presented when contaminated water used for irrigation has the potential to introduce new exposure pathways. Studies to determine the accumulation and morphological effects of cyanotoxin exposure on agricultural crops have indicated that there is a potential exposure pathway that needs to be considered. Further, the determination of toxin fate in the soil will elucidate the risk to groundwater sources. Using computer models the fate and transport of cyanotoxins in the environment is illustrated to better determine the risks associated with use of this water for irrigation purposes.

Project type: Research, Scholarship, and Entrepreneurship

216 - Saeed Nozhati

Stochastic System Study of Urban Recovery in the Aftermath

2017 Fall - Civil and Environmental Engineering

The functioning of buildings and lifeline systems in the aftermath of natural hazard events, such as earthquakes, is critical to the well-being of urban communities. We propose to model community-restoration processes following natural scenario hazard events, based on discrete state, continuous time Markov Chains. A testbed community modeled after Gilroy, California, is presented as an illustration to study the manner in which interdependencies of buildings and lifeline systems affect community recovery of functionality following several scenario earthquakes. The methods of this study offer insights on the development of decision-making algorithms to prioritize repair of damaged civil infrastructure systems.

Project type: Research, Scholarship, and Entrepreneurship

217 - Kayla Janine Nuss

Heart Rate Validity for the Fitbit Charge and Apple Watch

2017 Fall - Health and Exercise Science

This study examined the validity of heart rate (HR) measurements for the Fitbit Charge HR 2 and the Apple Watch devices. Thirty young adults (15 females, 15 males, age 23.5 ± 3.0) completed the Bruce Protocol. HR measurements were recorded from the electrocardiogram (ECG) and each device every minute. The Apple Watch also showed lower relative error rates (RER) (2.4%-5.1%) compared with the Fitbit (3.9%-13.5%) for all exercise intensities. For both devices, the strongest relationship with ECG-measured HR was found for very light PA. The strength of the relationship declined with increases in exercise intensity for Apple Watch and Fitbit.

Project type: Research, Scholarship, and Entrepreneurship

218 - Yusra Mahmood Fundi Obeidat

Multi-Channel Potentiostate Integrated with Microfluidic Channel for Electrochemical Real-Time Monitoring

2017 Fall - Electrical and Computer Engineering

The development of an integrated sensor system to measure dissolved oxygen (DO), pH, glucose, and lactate. DO was measured amperometrically using a three-electrodes system. pH was measured potentiometrically using two electrodes system. Glucose and lactate were measured enzymatically by measuring the current generated from the oxidation of H₂O₂ generated from the catalysis of glucose or lactate at the WEs with their catalysis enzymes. A microfluidic chamber was made using SU8. The system has shown good linear responses with respect to: DO range of (0%-100%), pH of (1-14), glucose of (0-9) mM, and lactate of (0-6) mM.

Project type: Research, Scholarship, and Entrepreneurship

219 - Katherine Ruth Ellen Oldberg

Don't Lose Focus: Critical Repeat Photography of CSU's Campus

2017 Fall - History

Repeat photography is an effective way to analyze the built and natural environments in terms of time and space. Not only does critical repeat photography allow for historical analysis, it also requires keeping meticulous records, which can be used in future replication of the photographs and future research. Employing critical repeat photography to examine CSU's architecture tells us about literal snapshots of CSU's history and how these spaces have changed over time. Critical repeat photography of Morgan Library, Lory Student Center, Clark, and Green Hall demonstrates CSU's shift away from its post-war architecture towards a more cohesive vernacular.

Project type: Research, Scholarship, and Entrepreneurship

220 - Nicole Taylor Olivas
Neuropsychology of Suicidal Attempts Associated with Major Depression
2017 Fall - Psychology

This review systematically summarizes the literature focusing on neuropsychology of individuals diagnosed with major depressive disorder (MDD) who have a history of suicide attempts. The motivation for this review stems from the notion that suicide is a worldwide public health issue and that MDD is one of the most common precursors to suicide. These statistical trends demonstrate a need for effective diagnosis of individuals with MDD along with appropriate treatment methods. With proper, timely, and accurate diagnosis of MDD along with tailored treatment approaches, there is the potential to decrease the risk of suicide.

Project type: Research, Scholarship, and Entrepreneurship

221 - Nicole Fantana Opalinski
Nationwide Response of Outdoor Water Use to Climatic Factors
2017 Fall - Civil and Environmental Engineering

Urban water supply planning has become increasingly challenging under the effects of climate change, population growth, and altered land use patterns. Outdoor water use is a major component of the urban water budget, often accounting for over half of total annual household use in municipalities across the United States. This study aims to assess the relationship between outdoor water use for landscape irrigation and climatically-driven factors (i.e. precipitation, temperature, evapotranspiration) for 230 U.S. cities. Results of this study have implications for water resource planning, hydrologic considerations, and utility pricing structures.

Project type: Research, Scholarship, and Entrepreneurship

222 - Emily Rebecca Orlikoff
Differentiating Trampling Marks from Stone Tool Cut Marks on Bone
2017 Fall - Anthropology

Analysis of bone surface modifications has the potential to illuminate the paleoecological and behavioral contexts of faunal assemblages through identification of the accumulating agents. However, this requires accurate diagnosis of the various bone-modifying actors and processes. Resemblances in the morphology of stone tool cut marks and trampling-induced abrasion from large fauna are particularly problematic in assessments of bone assemblages based on surface modifications. This study is the first to use high-resolution 3-D profilometry to distinguish between individual trample and cut marks and provides a new understanding of the quantitative differences between these superficially similar bone surface modifications.

Project type: Research, Scholarship, and Entrepreneurship

223 - Mary Carmen Ortiz Castro
Ecology and Epidemiology of Bacterial Leaf Streak on Corn
2017 Fall - Bioagricultural Sciences and Pest Management

In 2016, the bacteria *Xanthomonas vasicola* pv. *vasculorum* was first reported in the United States as the causal agent of bacterial leaf streak on corn. Since corn represents a \$52.4 billion industry, this emerging pathogen represents a serious economic threat to U.S. maize production. The main problem with this bacterial disease is the lack of information related to its impacts, risks, biology, and host range. In this research, we studied different aspects related to the ecology and epidemiology of this disease in order to provide enough information to aid in the development of effective management strategies.

Project type: Research, Scholarship, and Entrepreneurship

224 - Jennifer Marie Owen

Video Games: A Driving Force for Learning New Media Compositions

2017 Fall - English

Video games play an integral role in the lives of adolescents and provide unique opportunities for active and engaged learning. This project contains an exploratory analysis of the narrative constructs within video games and investigates how they can be utilized as an educational tool in secondary English classrooms. As an alternative text, video games offer unique potential to study storytelling and elements of literature, while also providing new insights into digital compositions. Through analysis and evaluation, the development of an innovative curriculum is constructed in the hopes to persuade educators to seek more enriching learning opportunities for their students.

Project type: Research, Scholarship, and Entrepreneurship

225 - Arnold Paecklar

Solid-Gas Interactions in Porous Catalysts Investigated with Neutron Total Scattering

2017 Fall - Chemistry

Porous materials have widespread industrial applications in catalysis, but experimentally-derived microscopic details on the underlying gas-solid interactions are not readily available. Current analytical methods give information about either the crystal structure or the macroscopic kinetics involved in these processes. The development of a new combination of stroboscopic, isotope-contrasted neutron total scattering and Steady-State Isotopic Transient Kinetic Analysis provides insight into both areas. These data, combined with measurement of adsorption isotherms and theoretical considerations from Grand Canonical Monte Carlo simulation, enabled locating adsorption sites in our proof-of-concept system (nitrogen in calcium exchanged zeolite X) under operational conditions (1 atm, 300 K).

Project type: Research, Scholarship, and Entrepreneurship

226 - Lara Nicole Pantlin

Examining Biomarkers of Schizophrenia: Error-Detection in at-risk Populations

2017 Fall - Psychology

Past research suggests that reduced neurophysiological responses and deficiencies in metacognition are possible determinants of psychosis. The hypothesis is that those at-risk for psychosis would show reduced neurophysiological responses and a negative correlation between accurate responses and confidence-level, compared to controls. Participants were screened for psychosis, underwent EEG recordings of neurophysiology, and behavioral tasks that included confidence ratings. Analyses will use gamma-correlations comparing percent accuracy and confidence between groups. If those endorsing symptomatology associated with psychosis are responding to stimuli in ways that are congruent with trends found in schizophrenia, then together these indices could be considered biomarkers for schizophrenia.

Project type: Research, Scholarship, and Entrepreneurship

227 - Dylan Mckenzie Parker

The Role of Subcellular Transcript Localization in *Caenorhabditis Elegans* Embryogenesis

2017 Fall - Biochemistry and Molecular Biology

To better understand how cells acquire their identities, we have performed single-cell RNA-seq for each individual cell in the *Caenorhabditis elegans* early embryo. Investigation of the transcriptome profile has shown that there are many transcripts with cell-specific abundance patterns and interesting subcellular localizations. By identifying RNA sequences necessary or sufficient for transcript localization and exploring the impact of mRNA localization on protein production in a living system we hope to elucidate the mechanisms that result in specific RNA abundance patterns and to identify the impact of those transcripts on cell-fate determination.

Project type: Research, Scholarship, and Entrepreneurship

228 - Jamie Parnes

A Mediated Moderation Examining Young-Adult Marijuana Consequences by Sexual Orientation

2017 Fall - Psychology

Marijuana use varies by sex and sexual orientation (SO), with highest use among bisexual individuals. While use predicts numerous negative consequences, various protective behavioral strategies (PBS) may mitigate potential risks. Previous research has yet to examine if marijuana related consequences and PBS vary by SO. This study hypothesized that SO would predict consequences, moderated by sex, and mediated by PBS. Marijuana-using students from 11 universities were surveyed. Results indicated a curvilinear relation between SO and consequences among men, however not women. PBS mediated the relation between SO and consequences among men, and negatively predicted consequences among women.

Project type: Research, Scholarship, and Entrepreneurship

229 - Annette Irene Patton

Map of Surficial Geology, Denali National Park; Ongoing Hazards Analysis

2017 Fall - Geosciences

Landslides in Denali National Park and Preserve pose persistent hazards to people and infrastructure. To better understand the factors that control landslide occurrence, I am conducting spatial analysis of landslide occurrence, underlying bedrock, permafrost depth, and slope variables. Here I present a preliminary map of surficial geology for two reaches along the Park Road at 1:10,000 scale. Bedrock geology is dominated by volcanic and sedimentary rocks and unconsolidated sedimentary units. Landslides occur primarily in silica-rich volcanic rocks where clay layers facilitate sliding, and in unconsolidated units in areas of high relief.

Project type: Research, Scholarship, and Entrepreneurship

230 - Sushil Paudyal

Assessing the Efficacy of Treatments for Digital Dermatitis

2017 Fall - Animal Sciences

Non-antibiotic treatment in animal agriculture is in high demand due to the concern of antibiotic resistance. Three treatment options for treatment of digital dermatitis were evaluated for their ability to reduce pain, decrease the lesion size and reduction in lameness score. The results suggest that a combination of Copper sulfate and Iodine gives more favorable outcomes than a combination of Honey and Iodine. Many treated animals have re-occurrence of the disease condition suggesting that complete healing of the lesions require frequent and multiple treatments.

Project type: Research, Scholarship, and Entrepreneurship

231 - Ben Patrick Pawlowski

Kinematics of Soft Manipulators Enabled by Twisted-and-Coiled Actuators

2017 Fall - Mechanical Engineering

This work presents an approach for modelling and computing the forward and inverse kinematics of a soft manipulator driven by twisted-and-coiled actuators (TCAs). TCAs present an opportunity for continuum robots to have soft actuators that are completely embedded, electronically driven, and cheap to manufacture that allow for the generation of large forces and the possibility of self-sensing. Previously devised models for soft robots are incapable of incorporating TCAs as actuators due to the body and actuator deformations being highly coupled together. The model developed is capable of modelling soft manipulators that use other sorts of artificial muscles or tendons.

Project type: Research, Scholarship, and Entrepreneurship

232 - Taylor Person

Evaluation of Sorghum Bicolor Root Traits under Water Stress

2017 Fall - Bioagricultural Sciences and Pest Management

Agriculture is the largest consumer of fresh water and the availability of water is expected to decrease in future climate models. It is imperative we develop crop varieties with improved performance under water stress. One approach to improve water use efficiency is capitalizing on inherent drought tolerance in crops. Sorghum (*Sorghum bicolor*) is a grain crop adapted to drought stress. While many traits contribute to drought tolerance, the crucial role of roots in plant survivability and yield under drought is poorly understood. This study evaluated ten genotypes from a genetic mapping population to determine favorable root traits under drought.

Project type: Research, Scholarship, and Entrepreneurship

233 - Ari Alicia Blanchette Porter

Quaking Aspen Population Dynamics after Wildfire in Colorado

2017 Fall - Ecology

Projected decline in Quaking aspen extent has prompted land managers to categorize this keystone species as unworthy of management resources. Models predicting decline focus solely on top-down variables. We hypothesize that bottom-up variables also affect regeneration. We ask: have extensive, high-severity wildfires caused aspen regeneration in landscapes where it was not observed before fire? How do topographic variables affect regeneration success? In our plots, we found a mean aspen count of 177.13. Through continuing analysis, we expect to find successful aspen growth in landscapes where it was not previously observed. These results will apply to management plans throughout Colorado.

Project type: Research, Scholarship, and Entrepreneurship

234 - Alison Kathryn Post

How the Timing of Large Storms Impacts Arid Grasslands

2017 Fall - Biology

For the Southwestern United States, climate change models forecast longer droughts broken by fewer, larger rainfall events. While drought has been well-studied in semi-arid grasslands, few have focused on the timing of rainfall events. Therefore, I designed a field experiment to test how the timing of a single large rain event (deluge) influences plant production and carbon cycling of the shortgrass prairie. I added a deluge to plots in either early, mid, or later summer, and tracked soil moisture, soil respiration, and growth of the dominant species. The mid-summer deluge increased plant production, and therefore carbon sequestration, the most.

Project type: Research, Scholarship, and Entrepreneurship

235 - Nirmal Amrutbhai Prajapati

Accelerator Codesign as Non-Linear Optimization

2017 Fall - Computer Science

We propose a methodology to determine both hardware and software parameters for implementing a (family of) applications called dense stencil computations on programmable GPGPUs. We first propose a simple, analytical model for silicon area of accelerator architectures, and a workload characterization stencil computations. We combine this with an execution time model for such codes and formulate a mathematical optimization problem that seeks to minimize a common objective function of all the hardware and software parameters. We show that the performance improves by 2x with simple tweaks to the hardware parameters like changing the number of cores.

Project type: Research, Scholarship, and Entrepreneurship

236 - Julie Lanette Prosser

Desirable Stereotypes and Status Indicators for Fathers and Mothers

2017 Fall - Psychology

The status incongruity hypothesis explains why women experience backlash when gaining power at work. This study extends the SIH to examine possible backlash when men try to gain power at home. Participants completed one of eight surveys indicating the desirability and typicality of 144 traits among fathers and mothers. Status indications were manipulated. Results showed that gender stereotypes align with parental stereotypes: fathers should be agentic/independent, mothers should be warm/understanding. Adherence to these stereotypes indicate high status for fathers and mothers, respectively. Study 2 will examine the implications of parents deviating from these desired roles, but still wanting child custody.

Project type: Research, Scholarship, and Entrepreneurship

237 - Chris Matthew Raftery

Ghost Protests and Activism in the Digital Era

2017 Fall - Journalism and Media Communication

This study examines protesters' use of hologram images to conduct "ghost protests" that create the illusion of a mass physical presence or a virtual assemblage in order to protest the increasing criminalization of public gatherings and speech. With the complete implementation of digital technologies into a public space, there exists a need to revisit norms surrounding the communicative expectations concerning the role of the body in a physical environment. This project examines how the blending of digital and physical realms affects traditional notions of embodiment as well as what it means to "occupy" space in the digital era.

Project type: Research, Scholarship, and Entrepreneurship

238 - Ryan Lee Rahm-Knigge

"Social Anxiety and Personality Predict Engagement in Health-Risk Sexual Behaviors"

2017 Fall - Psychology

Social interaction anxiety, a facet of social anxiety disorder, has a heterogeneous presentation such that the majority of affected individuals are behaviorally inhibited while a significant minority engages in risky behaviors, including health risk sexual behaviors. This study utilized finite mixture modeling to discern profiles of social interaction anxiety and personality traits which predict engagement in risky behaviors and examined how the profiles differed in their likelihood of engagement in health risk sexual behaviors.

Project type: Research, Scholarship, and Entrepreneurship

239 - James Matthew Rankin

Cultural and Aesthetic Space in the Encyclopedic Novel

2017 Fall - English

In this presentation, I seek to examine ideas about how notions of space and place are formed within the genre of the encyclopedic novel. I will investigate the various definitions and types of space, focusing my attention on the interplay between cultural and aesthetic space. To this end, I will examine the encyclopedic novels *The Recognitions* by William Gaddis and *Almanac of the Dead* by Leslie Marmon Silko. I hope to illustrate the contingency of cultural and aesthetic space as determined by socio-historical forces. These hegemonic forces determine how we occupy, interact with, and think about spaces.

Project type: Research, Scholarship, and Entrepreneurship

240 - Naufal Bin Razin

Airborne Radar Observations of Rainband Structure in Hurricane Ophelia (2005)

2017 Fall - Atmospheric Science

One of the mechanisms proposed for the spin-up of the tropical cyclone (TC) mean tangential (swirling) circulation is the convergence of absolute angular momentum above the boundary layer in the outer-core region, which results in the broadening of the TC wind field. Mid-level inflow associated with TC rainband stratiform precipitation may be instrumental in spinning up the broader circulation and may be important in the development of secondary eyewalls. This analysis shows the concurrent presence of an elevated tangential wind maximum and a distinct mid-level inflow in the stratiform region, consistent with the proposed mechanism for TC intensity change.

Project type: Research, Scholarship, and Entrepreneurship

241 - Julia Elaine Reedy

Barriers and Norms Regarding Kidney Transplantation on Pine Ridge Reservation

2017 Fall - Anthropology

American Indian populations in the United States have, in recent years, been plagued by a diabetes epidemic of catastrophic proportions. On the Pine Ridge Indian Reservation, located in southwest South Dakota, discrimination, extreme poverty, rampant unemployment, limited access to healthy foods, and other factors have led the Oglala Lakota population to have the highest rates of End-stage renal disease (ESRD). Despite high rates of ESRD, American Indian populations have the lowest rates of kidney transplantation. This research explores the political economic barriers and cultural norms surrounding kidney transplantation as a treatment option for ESRD on the Pine Ridge Reservation.

Project type: Research, Scholarship, and Entrepreneurship

242 - Justin James Reid

Brain Protein Synthesis Rates in Mice Administered Rapamycin and Metformin

2017 Fall - Health and Exercise Science

The human population is increasing in age worldwide. Aging is the predominant risk factor for many chronic diseases. At the same time, aging is a target for slowing or preventing chronic disease. The pharmaceuticals, rapamycin and metformin, have been shown to slow the aging process through improvements in cellular protein homeostasis (proteostasis), of which protein synthesis is a critical component. Although much research has focused on rapamycin and metformin, their effect on proteostasis in the brain remains uninvestigated. Using stable isotopic tracers we showed that rapamycin and metformin differently effects brain protein synthesis rates in male and female mice.

Project type: Research, Scholarship, and Entrepreneurship

243 - Sutton Bradley Richmond

Validation of a Portable Instrument for Quantifying Balance Performance

2017 Fall - Health and Exercise Science

Maintaining balance while standing is a fundamental aspect underlying activities of daily living and is compromised in a variety of diseases, injuries, and aging. The high cost and restricted access of force platforms precludes postural stability evaluation outside the laboratory setting. This study compared a laboratory-grade force platform to a more affordable and portable assessment tool, the BTrackS balance plate, in healthy young adults. Correlations were calculated between the dependent variables obtained from both systems. Correlations were moderate to strong for most measures. The BTrackS can therefore be used as a low cost, portable alternative to reliably assess balance.

Project type: Research, Scholarship, and Entrepreneurship

244 - Kayla Ann Rink

Dairy Producer Perceptions of the Farmers Assuring Responsible Management Program

2017 Fall - Animal Sciences

The National Dairy Farmers Assuring Responsible Management (FARM) Animal Care program provides guidelines for dairies producing 98 percent of the U.S. milk supply. As dairy producer compliance is vital to the success of FARM, this project consisted of a nation-wide survey to assess producers' perceptions regarding value, design, and knowledge of the program. Forty-six percent of 483 participants did not think the program had value overall. Forty percent of participants offered suggestions for improvement, and 83 percent agreed that producers should have more input in the design of the program. Results from this study will inform future versions of FARM.

Project type: Research, Scholarship, and Entrepreneurship

245 - Marina Dallas Rodriguez

The Cost of Reproduction: Telomere Shortening in Nesting Tree Swallows

2017 Fall - Fish, Wildlife and Conservation Biology

Stress can have various effects on the health and longevity of organisms. One mechanism whereby stress exposure affects health and lifespan is telomere length, where high exposure to stressors is linked to telomere shortening and declines of individual fitness. To determine factors that affect telomere length in breeding Tree Swallows (*Tachycineta bicolor*), telomere length was measured in mothers and offspring throughout the breeding season, along with other variables such as nutrient availability, clutch size, and age of the mother. This study gives insight into the factors that cause long-term costs in breeding Tree Swallows that act via telomere shortening.

Project type: Research, Scholarship, and Entrepreneurship

246 - Bryn Ronalds

Response of Jet Stream Variability to Arctic Sea Ice Loss

2017 Fall - Atmospheric Science

The change in variability of the eddy-driven jet stream in response to sea ice loss and the associated Arctic warming is a topic of growing concern within the scientific community. Using a model hierarchy, we determined that the variance in jet position decreases across all experiments. In the mean, the jet profile narrows due to weakened westerlies on the poleward flank. This narrowing could explain the decreased variability, as it limits the distance eddies can travel and transport/deposit momentum, thereby limiting the jet's meridional movement. These eddies, called Rossby waves, drive and maintain the jet.

Project type: Research, Scholarship, and Entrepreneurship

247 - Heather Nicole Rubin

Manipulation of Metal-Organic Frameworks for Tunable Copper Release

2017 Fall - Chemistry

Antibiotic resistance encourages developing cutting edge technology to kill bacteria. Herein, we detail a new method towards controlling the release of copper ions, a known antibacterial agent, using metal-organic frameworks (MOFs). Through careful synthetic development and modification, one can control the wettability and the stability of MOF Cu₃(NH₂BTC)₂ to water. This enhances the overall utility of the material and provides a method for tunable release of antibacterial copper. These results may lead to new antibacterial materials and inspires current efforts to investigate the potential to utilize MOFs in therapeutic applications like antibacterial bandages.

Project type: Research, Scholarship, and Entrepreneurship

248 - Tait K. Rutherford

Future Fire: Climate Change and Wildland Fire Governance in Alaska

2017 Fall - Forest and Rangeland Stewardship

Climate Change Is Intensifying Wildland Fire Activity In Alaska, And Public Lands Managers Face An Increasing Demand For Fire Suppression Within A Complex Mosaic Of Land Jurisdictions, Policies, And Social And Political Pressures. We Studied How Fire Management Agencies Will Respond To Climatic Uncertainty. In Interviews With Fire Managers, We Investigated Future Management Options And Pathways To Needed Adaptations in Governance. We Applied Theories Of Adaptive Governance And Knowledge Management To Inform Our Analysis, Both To Shed Light On Current Needs In Alaska Fire Management And To Contribute To The Broader Literature On Governance Response To Climate Change.

Project type: Research, Scholarship, and Entrepreneurship

249 - Kirk Maddox Saylor

Exploring Alternative Futures of Landscape Change in Southeast Asia

2017 Fall - Anthropology

This project will identify patterns of land-use/land-cover change in the highlands of central Vietnam over the last 30 years and project future scenarios. Research will characterize discern patterns of change from an analysis of available observations, taken primarily from Landsat imagery using Geographic Information Systems (GIS) and Remote Sensing (RS) methods. An analysis of field data, collected at the local level, will link social, political, and economic factors to household decisionmaking processes. In an effort to forecast alternative futures, a spatially-explicit agent-based modeling approach will be used to operationalize and simulate different economic and policy scenarios.

Project type: Research, Scholarship, and Entrepreneurship

250 - Kara Scheel

Assessing Human Modifications to Floodplains using Large-Scale Hydrogeomorphic Floodplain Modeling

2017 Fall - Civil and Environmental Engineering

Human modifications to floodplains for water resource and flood management purposes have significantly transformed river-floodplain connectivity dynamics and have altered flow patterns that cause changes in the timing and extent of floodplain inundation processes. These hydrogeomorphic changes have likely resulted in negative impacts to aquatic habitat and ecological processes. The availability of large-scale topographic datasets at high resolution provide an opportunity for detecting anthropogenic impacts by means of geomorphic mapping. We have developed and are implementing a methodology for comparing a hydrogeomorphic floodplain mapping technique to hydraulically-modeled floodplain boundaries to estimate floodplain loss due to human activities.

Project type: Research, Scholarship, and Entrepreneurship

251 - Jacob Daniel Schneider

Selective Synthesis of Solid Ionically Conductive Materials through Electrochemical Corrosion

2017 Fall - Chemistry

In order to develop the next generation of solid-state energy storage devices, major improvements need to be made in fast ion conducting solid materials. We are aiming to accelerate the discovery of new materials by developing a synthetic paradigm wherein the synthetic method selectively forms materials with fast ionic conduction. We employ electrochemical corrosion to produce films of an ionic conductor directly on an electrode. This practical and scalable synthetic method yields a full half-cell, with a solid electrode and electrolyte, as the product. This new synthetic procedure allows for faster screening, and resulting materials displaying multiple desired properties.

Project type: Research, Scholarship, and Entrepreneurship

252 - Max C. Schulze

Exploring and Mitigating Failure Modes in Anodes for Li-Ion Batteries

2017 Fall - Chemistry

Next generation rechargeable batteries for electric vehicles and grid energy storage applications require long cycle lifetimes and greater energy densities than traditional intercalation Li-ion batteries. Replacing graphite with alloy anodes shows promise for increasing the lithium storage capacity of batteries, though the anodes suffer from mechanical instability and limited cycle lifetimes. Building off the promising behavior of Cu₂Sb alloy anodes for Li-ion batteries, we show how cycle lifetimes of electrodeposited Cu-Sb thin-films can be further improved by controlling undesirable mechano-chemical interactions at the film-substrate interface.

Project type: Research, Scholarship, and Entrepreneurship

253 - Luke Allen Schwerdtfeger

Sex, Drugs, and Salmonella: Rendezvous in the Colon

2017 Fall - Biomedical Sciences

Intestinal infections impact millions of people each year, often with ineffective treatments available. There is a lack of models capable of studying these infections that recapitulate the gut's cellular environment. Addressing this, we placed biopsies from human colon into culture, and maintained the cellular environment observed in vivo, in a dish. Using this model, sex differences in colonic T-cell responses to Salmonella were observed. When culturing biopsy tissue at ~1% oxygen there was an increase in epithelial cell birth compared to atmospheric oxygen. These results signal the need for controlling oxygen and tracking sex when studying colon-microbiome interactions.

Project type: Research, Scholarship, and Entrepreneurship

254 - Ashish Kumar Sedai

"Wage Determination under Imperfect Competition:

Indian Evidence, Post Reforms"

2017 Fall - Economics

The purpose of this paper is to chalk out the future of employment in a capitalist society. I used Wage indices and Monopoly indices to see how monopoly affects wages. The study is empirical and theoretical. The results suggest that market concentration is not bad for wage growth but the exercise of monopoly power that comes with concentration is and hence monopoly behaviour must be regulated for labour welfare.

Project type: Research, Scholarship, and Entrepreneurship

255 - Hailey Nicole Conover Sedam

An Experimental System to Study Meiotic Recurrent Copy Number Alterations

2017 Fall - Cell and Molecular Biology

In humans, de novo recurrent copy number variations (CNVs) arise during meiosis from non-allelic homologous recombination (NAHR) between low copy repeat elements (LCRs). These chromosomal rearrangements represent a significant source of genetic variation and are responsible for a wide variety of genomic disorders. To study LCR-mediated CNVs in the *Saccharomyces cerevisiae* model system, we created a prototype experimental system that simulates the meiotic NAHR that exists in humans. This system allowed us to not only measure the overall frequency of de novo meiotic recurrent CNVs, but also to determine the relative occurrence of each of the NAHR classes.

Project type: Research, Scholarship, and Entrepreneurship

256 - PJ James Seel

Weathering of Radio-Caesium Released from Fukushima Dai-ichi Nuclear Power Plant

2017 Fall - Environmental and Radiological Health Sciences

Radioactive Cs-137 and Cs-136 are the primary environmental concern after the 2011 explosion at the Fukushima Dai-ichi Nuclear Power Plant. Air dose calculations have been maintained by the government but there are few recent analyses of the dispersion and movement of the particle through the local environment. Contemporary descriptions of the changes in regional radioactivity would help inform the return of Japanese citizens to the area. Local remote radiation monitors and vehicle-based surveys help show the impact of weathering on radio-caesium compounds, showing the effectively double loss of these elements from the environment beyond expected decay.

Project type: Research, Scholarship, and Entrepreneurship

257 - Ben David Sencindiver

Self-Regulated Learning: A Tool for Understanding Disengaged Students in Calculus

2017 Fall - Mathematics

Calculus I continues to be a key gateway course to science, technology, engineering, and mathematics majors. Analysis of early online homework activity and help seeking behaviors can provide rich descriptions of students but provide misrepresentative information for students who have not yet engaged with these resources. Using self-regulated learning (SRL) theory as a way to understand student behaviors, online tools were designed to collect behavioral data which was used to create a SRL score based on in-course student activity. This work presents initial findings on the relationship between student behaviors in Calculus I, a behavioral SRL score, and failure rates.

Project type: Research, Scholarship, and Entrepreneurship

258 - Casey Marie Setash

Cinnamon Teal Nest Site Selection Influences Nest Survival in CO2017

Fall - Fish, Wildlife and Conservation Biology

Nest survival of ducks is partially a function of the characteristics of the site at which a bird chooses to nest. We investigated cinnamon teal nest survival in Colorado using a multi-state framework and assessed nest site selection using discrete choice models to explore whether the nest characteristics were adaptive. We monitored nests from 2015-2017 with overall nest survival estimates of 49%, 30%, and 44%, respectively. The relationships between habitat characteristics and nest survival varied both in direction and by nest stage, and nest site selection was predictive of future nest survival for some nest site characteristics but not others.

Project type: Research, Scholarship, and Entrepreneurship

259 - Kat Lin Sever

Examining Water Quality Trading through a Collective Action Lens

2017 Fall - Forest and Rangeland Stewardship

Water quality trading (WQT) is a collective action mechanism increasingly employed to address water quality concerns. However, many WQT programs have experienced relatively lethargic success. Few efforts have assessed WQT through the lens of collective action theory, which suggests that contextual variables dictate how effectively a collective action institution can organize and perform. This case study explores how emerging WQT programs are influenced by contextual variables. Results demonstrate that decentralized governance arrangements created a difficult environment for WQT program emergence by contributing to norms of regulatory aversion and obfuscating power distribution and rule development.

Project type: Research, Scholarship, and Entrepreneurship

260 - Nikki Marie Seymour

Subduction and Metamorphism of the Orocopia Schist from Zircon Geochronology

2017 Fall - Geosciences

Zircon U-Pb ages from the Plomosa Mountains, AZ record the subduction and metamorphism of the Orocopia Schist. Cathodoluminescence revealed varied zoning patterns and thin overgrowths. U-Pb analyses of zircon cores record dominantly Mesozoic peaks and lesser populations of Proterozoic peaks. The maximum depositional age, defined as the transition from scattered to low Th/U in zircon cores, varies from ~70-75 Ma and records the age of subduction. Ages of overgrowths ranged from ~45-75 Ma. Trace element analyses recorded a correlation between low Ce* (<60) and low Th/U (<0.1), suggesting the overgrowths developed during metamorphism in the presence of seawater.

Project type: Research, Scholarship, and Entrepreneurship

261 - Susmit Shannigrahi

Named Data Networking for Large Scientific Data Management

2017 Fall - Computer Science

Recent advancements in data collection, distribution, and analysis has transformed scientific domains. It has also created an unprecedented amount of data, easily reaching into the petabytes range. These datasets are distributed around the world and accessed by many collaborators. Traditional IP networks do not facilitate such workflows. Named Data Networking (NDN) is a new network architecture whose service model is better aligned with the needs of data-oriented applications. Our work uses contemporary scientific workflows to explore scientific data management problems. After we identify the problems, we discuss how NDN based solutions can help us simplify and improve these workflows.

Project type: Research, Scholarship, and Entrepreneurship

262 - Naman Sharma

Linking Chemical Composition, Volatility to Oxidative Potential of Diesel Exhaust

2017 Fall - Mechanical Engineering

The aerosol oxidative potential is emerging as an important aerosol property that could help identify the chemical mechanisms by which aerosols affect human health. This project conducted experiments with a non-road diesel engine for two different fuels (diesel and biodiesel) and two different engine loads (idle and 50% load) at 8 to 10 different dilution ratios on a combination of different filters. Ongoing work is focused on performing a multilinear regression to shed further light on the relationship between the measured aerosol properties (composition and volatility) and the oxidative potential.

Project type: Research, Scholarship, and Entrepreneurship

263 - Alyx Marie Shigenaga

Agriculture in a Changing Climate: Preventing Heat-Induced Plant Disease Susceptibility

2017 Fall - Bioagricultural Sciences and Pest Management

In conditions of increased temperatures, such as those predicted as a consequence of global climate change, defense responses of plants to pathogen attack are attenuated, leading to a condition known as heat-induced disease susceptibility. Here, I show that Arabidopsis plants impaired in the signaling of the plant hormone cytokinin are less affected by heat-induced disease susceptibility, and address the molecular mechanisms of this process. Results of my work indicate the value of cytokinin-based chemical and genetic approaches to diminish the negative consequences of disease as a means to improve crop production under warmer temperature conditions.

Project type: Research, Scholarship, and Entrepreneurship

264 - Tushar Manohar Shimpi

Retaining CdTe Alloy Composition in High Band Gap Solar Cells

2017 Fall - Mechanical Engineering

High band gap ternary alloys of cadmium telluride are good candidates for the top cells in multi-junction solar cells. For the past four decades, the research on high band gap solar cells has staggered due to the change in the poly-crystalline alloy composition during the fabrication process. In this study, a novel method is demonstrated on poly-crystalline Cd-Zn-Te alloy to retain the composition and maintain the high band gap required for the top cell. The method has also been implemented on Cd-Mg-Te alloy and can be further extended on Cd-Mn-Te alloy. This method has produced higher efficiency poly-crystalline Cd-Zn-Te devices.

Project type: Research, Scholarship, and Entrepreneurship

265 - Nara Shin

Printer and Paper Particle Emission and Toxicity Test from Shredding

2017 Fall - Environmental and Radiological Health Sciences

The aim of this research was to investigate and characterize airborne particles released from printing and shredding paper. The study was designed to evaluate the exposure using real time instruments and Tsai diffusion samplers to measure particle concentration and characterize particles using transmission electron microscopy (TEM), scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS) analysis. As results, printer emitted particles (PEPs) were determined in notable size with metal granules and graphite. Furthermore, potential risks to those whom may be exposed to such particles were also evaluated via cell toxicity test using human lung cells (BES2B and HBE1).

Project type: Research, Scholarship, and Entrepreneurship

266 - Xoco Anna Shinbrot

Determinants of Farmer Adoption of Climate Adaptation Strategies

2017 Fall - Ecology

This research explores the determining factors for farmer adoption of adaptation strategies in response to climate change. Farmers can adapt to changing climates through land use diversification, community investment, market diversification, technological investment, storing supplies, and migration. Researchers hypothesized that financial, physical and social capitals would be determining factors. We also hypothesized that external mitigating factors, including experience with natural disasters and climate perceptions would be determinants in adoption of adaptation strategies. Farmer responses were most strongly related to their experience of a natural disaster, followed by climate change perceptions, group participation, wealth, health, land holdings, and market distance.

Project type: Research, Scholarship, and Entrepreneurship

267 - Hazheen Khalil Shirnekhi

Characterizing the Role of BuGZ in Mitosis

2017 Fall - Biochemistry and Molecular Biology

BuGZ is a mitotic protein recently identified through an RNAi screen targeting human transcription factors to isolate essential regulators of glioblastoma stem cell expansion. We have shown healthy neural stem cells continue normal expansion when BuGZ is depleted, but glioblastoma stem cells experience a slow expansion and ultimately death. Through its known interaction with the key mitotic protein, Bub3, BuGZ is implicated in several key processes required for faithful chromosome segregation. We aim to understand which of these roles are the cause of BuGZ's "cancer lethality" and whether BuGZ can ultimately be used as a therapeutic against glioblastoma.

Project type: Research, Scholarship, and Entrepreneurship

268 - Nick Andrew Simpson

Investigating Water Management at Ancient Purepécha City Using LiDAR

2017 Fall - Anthropology

Water management infrastructure is critically important for all urban centers to sustain large populations. The recent application of LiDAR surveying methods at the ancient Purepécha city of Angamuco allows for mapping of the complex landscape at an incredibly high resolution. Using various visualization tools in ArcGIS, we can identify and map the constructed water management system that stored and moved water through the city for irrigating inner city gardens and sustaining the population of a large urban center. The objective of this research will ultimately be a complete map of watersheds and water control features across the site.

Project type: Research, Scholarship, and Entrepreneurship

269 - Nate Michael Sindt

Varietal Responses to Mitochondrial Inhibitor Fungicides Impact Yield in Wheat

2017 Fall - Biochemistry and Molecular Biology

Field studies in wheat have demonstrated that application of mitochondrial inhibitor (MI) fungicides can increase yield and biomass in the absence of fungal disease pressure. Here, we discovered varietal differences to the increased yield phenotype in response to MI in the field and aim to characterize the morphological and physiological effects of MI on varieties with opposing yield phenotypes. Our data shows that MI transiently influences photosynthesis in a variety-specific manner and leads to downstream changes morphology and yield. These data provide new evidence for varietal differences in response to MI treatment with applications to breeding approaches for improved yield.

Project type: Research, Scholarship, and Entrepreneurship

270 - Ingrid Jane Slette

Legacies of Precipitation Change Alter Ecosystem Responses to Extreme Drought

2017 Fall - Ecology

Global climate change is causing more extreme droughts, as well as subtler chronic changes in precipitation patterns. Both chronic and extreme precipitation change can alter ecosystem structure and function, and these alterations may affect how systems respond to future extreme climatic events. Understanding how legacies of various past precipitation changes may alter the effects of future extreme droughts will be important for predicting ecosystem responses to climate change. We investigated how ecological legacies of experimentally-imposed chronic and extreme precipitation changes altered the impact of an extreme drought on an economically-important grassland ecosystem.

Project type: Research, Scholarship, and Entrepreneurship

271 - Brittany Nicole Smith

Match Me if You Can! Phenological (Mis)Match in Plant-Insect Interactions

2017 Fall - Ecology

Anthropogenic climate change is altering the ecology of habitats and the life histories of species that live within it. Not only does climate change influence phenologies and geographic ranges of individual species, but variation in temperature and precipitation can affect how and when species interact. Ecological interactions between plants and their insects, pollinators and herbivores, are affected by abiotic and biotic factors, such as; temperature, allelochemicals, and herbivory. In our study, cow parsnip *Heracleum maximum* Bartram (Apiaceae), in a changing elevation gradient, may experience fitness differences if its phenology is matched or mismatched with its pollinators and/or herbivores.

Project type: Research, Scholarship, and Entrepreneurship

272 - Joey Keith Smith

Consequences of Poly-Simultaneous Use of Marijuana and Alcohol

2017 Fall - Psychology

Marijuana and alcohol are commonly used by many young adults. Recent studies have indicated that past-year prevalence rates of marijuana have doubled over the past ten years, with rates of alcohol-use disorder continuing to grow as well. This increase is also found in the simultaneous consumption of marijuana and alcohol. Simultaneous poly-substance use is the ingestion of two or more substances within the same period, so that they interact in an additive or synergistic manner. Results indicate that the simultaneous use of marijuana and alcohol significantly moderates the relations of substance use frequency and consequences experienced.

Project type: Research, Scholarship, and Entrepreneurship

273 - Claudia M. Solt

Obesity-Induce Lymph Node Dysregulation: A TEM Analysis

2017 Fall - Food Science and Human Nutrition

Excess adiposity has been demonstrated to induce a chronic low grade inflammatory state, increasing disease susceptibility. Our previous studies demonstrated that mice fed a high fat diet exhibited greater collagen accumulation in the visceral lymph nodes than a CHOW fed group. In our present experiment, TEM is used to closely explore and elucidate the mechanisms by which fibrosis influences lymph node microarchitecture and cellular communication. Taken together this data can help support the development of preventative measures to reduce susceptibility to immune dysregulation associated with obesity.

Project type: Research, Scholarship, and Entrepreneurship

274 - Michael David Somers

Sustainability of Microalgae Cultivation as a CO2 Mitigation Strategy

2017 Fall - Mechanical Engineering

The world is facing severe climate change due to atmospheric accumulation of greenhouse gases, predominately CO2. Microalgae are a promising organism that may be converted into useful products like renewable biofuel and bioproducts, and like terrestrial plants, microalgae consume CO2 through photosynthesis. This study explored the sustainability implications, both environmental and economic, of transporting and supplementing waste CO2 from power plants for the cultivation of microalgae and conversion to renewable biofuel. Results indicate that economics, not energy consumption and emissions, limit the sustainability potential of microalgae as a CO2 mitigation strategy.

Project type: Research, Scholarship, and Entrepreneurship

275 - Kelley Jane Sorenson

#PhotoshopFail: The Ethics of Photo Manipulation in the 21st Century

2017 Fall - Journalism and Media Communication

Photograph manipulation has existed nearly as long as photography itself. Throughout history, certain fine art photographers shared the belief that much of the creative process came after the image was captured, then crafted into unique artwork. In most cases, photographers should be allowed artistic license with their photos. However, photo manipulation gets precarious when photos are intended as depictions of reality, such as in photojournalism. With a powerful software like Photoshop, it is possible to skillfully manipulate photos so they are unrecognizable, or alter them just enough to change their story. The ethical question is: where is the line?

Project type: Research, Scholarship, and Entrepreneurship

276 - Evan Sproul

Viability of a Net-Zero-Energy Campus at the National Western Center

2017 Fall - Mechanical Engineering

As a partner in the future redevelopment of the National Western Center, Colorado State University (CSU) was tasked with modeling energy technologies and assessing the feasibility of achieving a net-zero-energy campus. This assessment consisted of three stages. The first stage projected energy demands based on building types and corresponding energy use indices (EUI). The second stage focused on researching energy technologies and developing an interactive energy model. The third stage leveraged this model to evaluate the economic viability of various technologies. Results of this assessment will guide technology selection and economic analysis throughout future detailed design phases of the redevelopment.

Project type: Research, Scholarship, and Entrepreneurship

277 - Brooke Ellen Stamper

Response of Glaciers to Climate Change in the Wind-River Range

2017 Fall - Ecology

The Wind River glaciers have been losing mass in recent decades. Runoff from these glaciers affects downstream ecosystems by influencing the quantity, seasonality, and chemistry of the water. We describe the present state of the glaciers and examine their projected rates of decline. We present data of glacier ablation rates, snow line elevations, and streamflow. In addition, we compare measured glacier mass loss to streamflow at the glacier's terminus, and a USGS stream gauge downstream. The project's intention is to explore the fate of glacial runoff as it flows downstream into ecosystems, rangelands, and communities important to local people.

Project type: Research, Scholarship, and Entrepreneurship

278 - Cara Elizabeth Steger

Collaborative Models for Adaptive Conservation in the Ethiopian Highlands

2017 Fall - Ecology

My dissertation seeks to advance empirically informed theories of collaborative governance to improve the management of complex social-ecological systems. Participatory modeling is increasingly used by academics and development practitioners to encourage collaborative environmental governance, yet little research has been done to measure the impacts of this process on local ecological knowledge, cultural norms, and cultural values. My research investigates the precise cultural and cognitive changes that occur when participants engage with a technological, scientific model in a participatory process. This detailed case study on technologically-mediated cultural change informs the study and management of adaptive and resilient social-ecological systems worldwide.

Project type: Research, Scholarship, and Entrepreneurship

279 - Emily R. Stuchiner

Using N₂O Isotopomers to Indicate Ecosystem Stress from N Pollution

2017 Fall - Ecology

Chronic nitrogen (N) deposition in Rocky Mountain National Park (RMNP) perturbs ecosystem structure and function via poorly understood mechanisms that are difficult to manage. Many microbially-catalyzed N transformations produce nitrous oxide (N₂O), and the isotopic composition of N₂O varies among N₂O-generating processes. Importantly, N₂O isotopic signatures can indicate specific ecosystem responses to N deposition. Thus, my work uses N₂O isotopomers as diagnostic indicators of N stress. My data from RMNP finds different N₂O isotopic signatures among ecosystems, suggesting that RMNP landscapes are differentially affected by N deposition. Future work examines which N₂O isotopomers indicate specific ecosystem perturbations from N deposition.

Project type: Research, Scholarship, and Entrepreneurship

280 - Hailey Marie Summers

Sustainability Assessment of Obtaining Bioproducts from Guar and Guayule

2017 Fall - Walter Scott, Jr. College of Engineering

The United States currently imports two arid crops, guar and guayule, to meet the demand of their products leading to a non-sustainable bioeconomy. The overall sustainability of producing high-valued products, guar gum from guar and rubber from guayule, will be evaluated through techno-economic (TEA) and life cycle assessments (LCA). System models have been developed at the process level and will be leveraged to evaluate the full production pathway. Efforts are focused on fully developing the TEA and LCA for guar gum and rubber to provide competitively priced and sustainable products to support the U.S. bioeconomy.

Project type: Research, Scholarship, and Entrepreneurship

281 - Ray Vincent Sumner

The Powell Sesquicentennial: An Interdisciplinary Reassessment of the Powell Expeditions

2017 Fall - History

2017 begins the sesquicentennial of Major John Wesley Powell's expeditions to the American West. Unfortunately, previous examinations focused on Powell himself or the 1869 expedition through the Grand Canyon. In doing so, historians overlooked a great deal of material related to the early expeditions that helps explain why Powell conducted his expeditions in the manner he did and provides a more detailed understanding of his impact on the development of the American West. My research uses an interdisciplinary approach (material culture, history, archaeology, geography, digital humanities) to identify new sources and place his expeditions in a more accurate context.

Project type: Research, Scholarship, and Entrepreneurship

282 - Jiefeng Sun

TCA Actuated Soft Robot with Self-Sensing and Stiffness Tuning Capability

2017 Fall - Mechanical Engineering

Twisted and coiled actuator (TCA) fabricated by twisting and coiling conductive sewing threads is widely investigated for its high power-weight ratio and the capability to act as a sensor to feedback stroke information, which raises the possibility of eliminating other sensors. Soft robot actuated by TCA can achieve various reconfiguration through tuning stiffness of its rigid links. Therefore, a robot of combination of stiffness tuning, artificial muscle actuation and sensing technology proposed in this work will enable its compliant body to move exactly to a desire shape and hold that shape without additional power.

Project type: Research, Scholarship, and Entrepreneurship

283 - Joshua Michael Svendsen

Methylation Likely Links C. Elegans Primary and Secondary Small RNAs

2017 Fall - Cell and Molecular Biology

RNA interference (RNAi) is a conserved process by which small RNAs and their Argonaute effectors regulate diverse cellular processes. In *C. elegans*, primary small RNAs initiate both exogenous and endogenous RNAi by directing the association of target mRNAs with a secondary small RNA amplification complex to conduct genome surveillance. Two classes of primary small RNAs must be methylated in order to function. We demonstrate that, without methylation, these RNAs are degraded and the secondary small RNAs that depend on them are depleted. Additionally, we identify a new population of methylation-dependent small RNAs and show that exogenous primary siRNAs are methylated.

Project type: Research, Scholarship, and Entrepreneurship

284 - Clayton W. Swanson

Associations between Motor Cortex Inhibition and Gait Variability

2017 Fall - Health and Exercise Science

Motor cortex inhibition is significantly associated with complex bimanual control of the upper extremities. It remains unclear whether this same relationship exists for the lower extremities. We utilized transcranial magnetic stimulation to assess motor cortex inhibition and wireless inertial sensors to quantify gait variables to assess how cortical inhibition contributes to the control of gait in healthy, young adults. Gait cycle duration variability was significantly correlated to right motor cortex inhibition. The results of this study indicate that motor cortex inhibition may be associated with complex components of gait in a similar fashion to its association with bimanual control.

Project type: Research, Scholarship, and Entrepreneurship

285 - Catherine Audrey Tait

Impact of Learning Ability on Navigation and Longevity in Honeybees

2017 Fall - Ecology

In honeybees, visual and olfactory learning are assumed to make a positive contribution to the foraging ability of an individual. However, there is a significant energetic cost associated with these learning abilities. Little is known regarding how interindividual variation in cognitive capacity translates to survival. In honeybees, we tested if high olfactory learners show a higher foraging performance, and measured if the energetic cost associated with learning imposes a trade-off between different cognitive domains, thereby leading to specialization in different learning abilities. Additionally, we used wing damage as a measure of how learning ability might translate to differences in survival.

Project type: Research, Scholarship, and Entrepreneurship

286 - Mohammad Tanhaemami

Label-Free Quantification for Flow Cytometry

2017 Fall - Chemical and Biological Engineering

In flow cytometry, specific biochemical labels are not always available; they can be costly and can disrupt natural cell behavior. Label-free quantification strategies are needed to correct these issues. Unfortunately, label-free strategies may be difficult to learn when applied labels or other modifications in training data inadvertently modify intrinsic cell properties. We develop a new approach based upon population statistics and machine learning to integrate labeled and unlabeled training data and to identify models for quantitatively accurate label-free quantification. We apply our approach to make label-free measurements of lipid content in microalgae cells.

Project type: Research, Scholarship, and Entrepreneurship

287 - Janee Dawn Terwoord

Novel Role of Acetylcholine in Blood Flow Regulation in Humans

2017 Fall - Health and Exercise Science

This research addresses how the molecule acetylcholine interacts with the sympathetic nervous system to regulate blood flow and oxygen delivery to working skeletal muscle in humans. We measured forearm blood flow and arterial pressure to assess vasoconstriction in response to local, intra-arterial infusion of an α 1-adrenergic receptor agonist under control conditions and during local inhibition of muscarinic ACh receptors via atropine. We demonstrate, for the first time, a physiological role for endogenous ACh in blood flow regulation. To date, inhibition of several key pathways in this experimental model has had no impact on sympatholysis; thus, these findings are quite remarkable.

Project type: Research, Scholarship, and Entrepreneurship

288 - Aanand Thiyagarajan

Analysis of MgZnO/CdTe Solar Cell Interface Using Density Functional Theory

2017 Fall - Mechanical Engineering

This is a Density Functional Theory (DFT) study on a MgZnO/CdTe interface, one that yielded a record power conversion efficiency in its class of thin film photovoltaic devices. DFT is a first principles method to determine the electronic structure of a material. Electronic properties such as band gap and density of states for this interface were determined. These computations have been useful in studying complex materials (such as this interface) and can be used to model the properties and ultimately predict the behavior of such materials.

Project type: Research, Scholarship, and Entrepreneurship

289 - Thomas Jesse Timberlake

Science and Climate Change Adaptation: U.S. Forest Service Vulnerability Assessments

2017 Fall - Forest and Rangeland Stewardship

Land management agencies and other organizations develop climate change vulnerability assessments to summarize, rank, or quantify potential impacts of climate change on ecosystems and associated resources. Adaptation to these impacts is a pressing management priority for these agencies. However, there exists a gap between the development of science and on-the-ground management adaptation activities. I conducted a document analysis of approximately 40 vulnerability assessments conducted by or for the U.S. Forest Service to identify current practices in vulnerability assessments and identify opportunities to innovate the delivery of science to support adaptation.

Project type: Research, Scholarship, and Entrepreneurship

290 - Paul Kendrick Todd

Solid-State Preparation of Transition-Metal Oxides at Low Temperatures

2017 Fall - Chemistry

Transition metal oxides are extensively studied as functional materials for batteries, photovoltaics, multiferroics, and superconductors. Although promising in application, the preparation of new oxide materials is limited, as high temperatures are needed to overcome solid-state diffusion. Such harsh conditions almost exclusively favor the thermodynamically stable product, thus limiting access to new or metastable phases that may have desirable properties. Herein, we present work on the preparation of metastable ternary transition-metal oxides through assisted metathesis reactions. By changing the composition of the reaction precursors, different kinetic products are formed at low temperatures.

Project type: Research, Scholarship, and Entrepreneurship

291 - Ben Christopher Trabling

Upper Tropospheric Temperature Impacts in Idealized Hurricanes

2017 Fall - Atmospheric Science

The physical mechanisms by which the upper tropospheric thermal structure and radiative forcing impact hurricane intensity and structure are complicated by interactions between clouds, radiation, and storm dynamics. Idealized Weather Research and Forecasting (WRF) ensembles were employed to provide insight into how tropopause temperature and radiative tendencies affect hurricane intensity and structure. Simulated hurricane intensity and structure were sensitive to colder tropopause temperatures using only longwave radiation, but were less sensitive using full-radiation and no-radiation schemes. Decreased tropopause temperatures caused stronger mean upper tropospheric mass flux. Longwave radiation feedbacks with upper-level clouds to enhance outflow and reduce static stability.

Project type: Research, Scholarship, and Entrepreneurship

292 - Kai-chih Tseng

Extended Prediction of the Midlatitude Response to Strong MJO

2017 Fall - Atmospheric Science

The MJO forces strong variations in extratropical circulations that have important implications for S2S prediction. In particular, certain MJO phases are characterized by a consistent modulation of geopotential height in the extratropical regions across different MJO events. Until recently, only limited research has examined the relationship between these robust tropical-extratropical teleconnections and model prediction skill. In this study, reanalysis data and ensemble hindcasts are used to demonstrate that the phase-dependent robust teleconnections benefit prediction skills at forecast leads of up to 3 weeks. These periods of enhanced prediction capabilities extend the possibility for skillful weather prediction beyond traditional prediction limits.

Project type: Research, Scholarship, and Entrepreneurship

293 - Sydney Simone Turner

The Evolution from Conventional to Emerging Wastewater Management Approaches

2017 Fall - Civil and Environmental Engineering

The incessant degradation of water quality around the world poses many significant environmental, economic, and social implications. My proposed research focuses on the evolution of wastewater treatment, from conventional, alternative, and emerging treatment processes utilized around the world. The purpose of my research is to synthesize the benefits and drawbacks of the different technologies/processes using a socio-political framework and comparative technical life cycle assessments. South Africa and Fort Collins will be presented as case studies to expand on current practices and future water management plans for the wastewater sector in these areas.

Project type: Research, Scholarship, and Entrepreneurship

294 - Hamed Vahabi

Application of Shape Memory Polymers in Wettability Transition on Superomniphobic Surfaces

2017 Fall - Mechanical Engineering

Superomniphobic surfaces are extremely repellent to virtually all liquids. Prior work have emphasized the importance of low solid surface energy and re-entrant texture (i.e., convex or overhang texture) in the design of superomniphobic surfaces. While superomniphobic surfaces with a wide variety of textures have been reported in literature, to the best of our knowledge, there are no reports of superomniphobic surfaces with metamorphic textures (i.e., textures that transform their morphology in response to an external stimulus). In this work, we present the first-ever metamorphic superomniphobic (MorphS) surfaces fabricated with a thermo-responsive shape memory polymer.

Project type: Research, Scholarship, and Entrepreneurship

295 - Zackary J. Valenti

Investigation of Phytochemical Nrf2 Activation in Aged Mice

2017 Fall - Health and Exercise Science

The Age-Related Increase In Oxidative Stress Is A Consequence Of Reactive Oxygen Species (ROS) Generation Exceeding The Capacity Of Antioxidant Enzymes To Eliminate ROS. Interestingly, Normal Concentrations Of ROS Are Generated As By-Products Of Metabolism. Yet, Dysregulation Between ROS Generation And Clearance Causes Oxidative Damage To Cellular Components, Predominately Proteins. The Transcription Factor Nuclear Factor Erythroid-Derived 2-Like 2 (Nrf2) Induces Gene Expression Of Antioxidant Enzymes, Anti-Inflammatory Proteins, And The Proteasome, Effectively Regulating Mechanisms Of Cytoprotection And Proteostasis. However, Nrf2 Activity Diminishes With Aging; Thus, Investigating Cytoprotective Gene Targets Amenable To Phytochemical Activation Is A Promising Strategy For Healthspan Extension.

Project type: Research, Scholarship, and Entrepreneurship

296 - Hannah Jean Van Ark

Effects of Red Beetroot Juice Consumption on Vascular Oxidative Stress

2017 Fall - Food Science and Human Nutrition

Oxidative stress (OS) is a major cause of age-related endothelial dysfunction, a precursor to cardiovascular disease. Red beetroot juice (RBJ) contains bioactive compounds that may improve endothelial dysfunction by reducing OS, partly through increasing antioxidant defense. In a randomized, double-blind, placebo-controlled crossover clinical trial, 16 healthy, overweight/obese men and postmenopausal women aged 40-65 years will consume RBJ, RBJ without nitrate, placebo with nitrate, or placebo for 4 weeks. Endothelial cells biopsied before and after each treatment will be analyzed for expression of proteins associated with OS and antioxidant defense. RBJ is anticipated to exhibit the greatest improvements in these biomarkers.

Project type: Research, Scholarship, and Entrepreneurship

297 - Tara Lee Van Surksun

Elucidating Energy Partitioning Trends in Hydrocarbon Plasmas for Plasma-Assisted Catalysis

2017 Fall - Chemistry

Plasma-assisted catalysis (PAC) has been investigated as a promising method for pollution control, specifically for conversion or removal of volatile organic compounds. The utility of PAC is severely limited by an overall lack of understanding of plasma chemistry and the reactions occurring at the plasma-catalyst interface. Through spectroscopic techniques, the present work investigates energy partitioning trends in hydrocarbon inductively-coupled plasma systems when a catalytic material (e.g., nanostructured SnO₂ and TiO₂) is placed in the plasma. Ultimately, these studies aim to unravel the complex chemistry of hydrocarbon plasma systems for PAC to achieve a viable method of pollution control.

Project type: Research, Scholarship, and Entrepreneurship

298 - Daisy Whitfield Vandenburg

Solemnly Staring South: Faulkner's Confederate Monument

2017 Fall - English

Nationwide, communities are grappling with the issue of what to do with Confederate monuments in public spaces. The debate surrounding the presence of these statues became even more divisive after last month's violent protests led by white supremacists in Charlottesville, Virginia. In my research, I explore the function of a Confederate monument in Faulkner's *The Sound and the Fury*, *Light in August*, and *Requiem for a Nun*.

Project type: Research, Scholarship, and Entrepreneurship

299 - Farah Zamira Vera Maloof

Loss of Insecticide Resistance in Mexican *Aedes Aegypti* Mosquito Populations

2017 Fall - Microbiology, Immunology, and Pathology

Worldwide, pyrethroid insecticides have been used to kill *Aedes aegypti* mosquitoes that transmit pathogens of public health concern and the indiscriminate use of pyrethroids has caused insecticide resistance. Since there are few alternative types of insecticides to control mosquito populations, rotations of insecticides are imperative. The objective of this research is to evaluate the loss of pyrethroid resistance in *Ae. aegypti* populations from southern Mexico. Field pyrethroid resistant populations of *Ae. aegypti* were maintained without pyrethroid pressure. LC₅₀, VGSC mutations and metabolic enzymes were evaluated. After seven generations, six of the eight populations had significant decreases in levels of resistance.

Project type: Research, Scholarship, and Entrepreneurship

300 - Nadia Maria Vieira Sampaio
Mitotic Systemic Genomic Instability in Yeast
2017 Fall - Cell and Molecular Biology

Point mutations and alterations in chromosome structure are generally thought to accumulate gradually and independently over many generations. We combined complementary genetic approaches in budding yeast to track the appearance of chromosomal changes resulting in loss-of-heterozygosity (LOH). Contrary to expectations, our results provided evidence for the occurrence of non-independent accumulation of multiple LOH events over one or a few cell generations. These results are analogous to recent reports of bursts of chromosomal instability in humans. Our approach provides a framework to further dissect the fundamental mechanisms underlying systemic chromosomal instability processes, including in the human cancer and genomic disorder contexts.
Project type: Research, Scholarship, and Entrepreneurship

301 - Saddam Qahtan Waheed
GLUE Analysis and Optimal Operation for Diyala River in Iraq
2017 Fall - Civil and Environmental Engineering

Hydro-climatic model's Sensitivity is necessary to develop optimal dam operation schemes under future uncertainty. The main objective of this study is to quantify the dam operation schemes under future variability using GLUE method. Different data sources were used to prepare accurate data in spatial and temporal scale using a random cascade and Kriging-regression techniques. The results show that the optimal model performance is 0.731 NSCE and the second soil depth is the most sensitive parameter. The ongoing work is to generate thousands climatic scenarios by a developed CLIGEN weather generator to capture future climate variation of the dam operations.
Project type: Research, Scholarship, and Entrepreneurship

302 - Ethan Sheppard Walker
Association of Household Air Pollution with Self-Reported Symptoms in Honduras
2017 Fall - Environmental and Radiological Health Sciences

Household air pollution from the use of solid fuel cookstoves caused an estimated 2.9 million premature deaths globally in 2015. Our objective was to assess the association of household air pollution from biomass cookstoves and self-reported symptoms among women in rural Honduras. We assessed exposure to household air pollution using stove type and 24-hour average personal and kitchen fine particulate matter, and used questionnaires to assess health symptoms. We observed lower exposure to fine particulate matter and lower odds of self-reported symptoms for women using improved "Justa" biomass stoves compared to those using traditional biomass stoves.
Project type: Research, Scholarship, and Entrepreneurship

303 - Erkang Wang
Transient Absorption Imaging of Cytochrome Using Pump-Probe Microscope
2017 Fall - Electrical and Computer Engineering

Cytochrome has the potential to become the indicator of mitochondrial metabolism in cancer cell. However since cytochromes cannot fluoresce, fluorophore has to be attached to cytochrome. Yet biology label can perturb the natural mitochondrial metabolism. In order to develop a label free imaging technique, we are trying to build a pump-probe microscope to observe natural metabolism in cancer cell based on cytochrome transient absorption. In this poster, a pump-probe microscope has been introduced. The difference between Transient absorption signals achieved from two redox states of cytochrome C has been achieved as well.
Project type: Research, Scholarship, and Entrepreneurship

304 - Lei Wang

Zika Virus Antibody Detection Using an Ultrasensitive Capacitive Device

2017 Fall - Biomedical Engineering

Zika virus (ZIKV), a flavivirus closely related to other mosquito-borne pathogens of clinical importance, is at the center of an ongoing pandemic. The unavailability of therapeutics and vaccines increases the demand for early ZIKV infection diagnosis. The gold standard methods for ZIKV detection require significant laboratory instrumentation, knowledge and training to perform the tests and interpret the results. The rapid spread of ZIKV creates a strong need for a low-cost, point-of-care diagnostic platform. In our study, a capacitive device designed for point-of-use applications was developed for the ultrasensitive and specific anti-ZIKV antibody detection.

Project type: Research, Scholarship, and Entrepreneurship

305 - Leo Warzea Lima

The Effect of Selenium on Glucosinolates Accumulation in *Stanleya Pinnata*

2017 Fall - Biology

Selenium (Se) is a sulfur (S)-like a beneficial element to plants. Most species show toxicity at tissue Se concentrations >100 mg Se/kg DW. However, a small group of plant species can hyperaccumulate and tolerate Se up to 15,000 mg/kg DW, which increases plant defense to herbivory. In the hyperaccumulator *Stanleya pinnata* (Brassicaceae), the S-containing glucosinolates (GLS) also function as defense to herbivory. In light of the similar ecological function of Se and GLS in *S. pinnata*, this project aims to investigate the correlation between the high Se accumulation trait and the GLS content and composition in tissues of this hyperaccumulator.

Project type: Research, Scholarship, and Entrepreneurship

306 - Colleen Lanza Watkins

The Picornaviral Polymerase Fingers Domain Controls RNA Binding and Translocation

2017 Fall - Biochemistry and Molecular Biology

The picornavirus family of viruses includes poliovirus, the causative agent of paralytic polio and coxsackievirus, which is responsible for viral-heart-disease. Picornaviruses contain a single-stranded positive-sense RNA genome replicated by 3Dpol, an RNA-dependent RNA polymerase (RdRP). Crystal structures of 3Dpol from multiple picornaviruses have shown a conserved polymerase fold analogous to a "right hand" composed of fingers, palm and thumb domains. These crystal structures also identified unique regions in the fingers domain whose function in 3Dpol were unknown. Through biochemical kinetic analysis we have now determined the purpose of these regions, and their effects on the catalytic cycle of 3Dpol.

Project type: Research, Scholarship, and Entrepreneurship

307 - Danielle Frances Weaver

Preliminary Computational Analysis of Data Collected from Xylazine-Induced Ataxic Horses

2017 Fall - Microbiology, Immunology, and Pathology

There is a need for more reliable assessment of equine neurological disease. To score ataxia (incoordination), veterinarians currently use a grading scale from 0 to 5; however, this scale lacks discrimination and there is poor assessor agreement. In this study, data were collected from fourteen horses using inertial measurement unit (IMU) devices under normal and sedated conditions. Custom computer scripts were used to evaluate gait factors, such as pace and stride length consistency, in control and sedated data. This will aid in creating a computational program to objectively diagnose equine gaits which do not fall within normal parameters.

Project type: Research, Scholarship, and Entrepreneurship

308 - Derek Thomas Weber

Volatile Organic Compound Concentrations in Northern Colorado and Future Impacts

2017 Fall - Atmospheric Science

Advances in unconventional extraction of oil and natural gas (O&NG) have caused an increase in the number of wells in the Colorado Northern Front Range which has doubled Colorado's natural gas production over the past 15 years. Growth in O&NG activity can lead to increased emissions of Volatile Organic Compounds (VOC) which may negatively impact air quality and human health. This study looks at 5 sites (school, gas station, residential area and 2 natural areas) in the Fort Collins and Timnath in order to provide a useful baseline of VOC concentrations for assessing the impact of future O&NG development activities.

Project type: Research, Scholarship, and Entrepreneurship

309 - Lisa McBride Weber

Identification of Gene Regulation Models from Single-Cell Data

2017 Fall - Chemical and Biological Engineering

In quantitative biology, one may use many different model scales or approaches to match models to experimental data. We use a simplified gene regulation model with a time-dependent input signal to illustrate many concepts, including ODE analyses of deterministic processes; chemical master equation and finite-state projection analyses of heterogeneous processes; and stochastic simulations. We consider several model hypotheses and simulated single-cell data to illustrate mechanism and parameter identification as precisely as possible, while exploring how approach or experiment design affect parameter uncertainty. Our approach is based upon previous investigations to explore signal-activated gene expression models in yeast and human cells.

Project type: Research, Scholarship, and Entrepreneurship

310 - Maggie Dorothy Weinroth

Effects of Ceftiofur and Chlortetracycline on Feedlot Cattle Resistomes

2017 Fall - Animal Sciences

Treating cattle with antimicrobials is controversial because of worries regarding antimicrobial resistance. This study investigated the effect of administration of two antimicrobials on feedlot cattle antimicrobial resistance, ceftiofur and chlortetracycline. Feces were collected on day 0 and 26 from all animals; DNA was extracted and libraries were prepared and sequenced. Treatment with ceftiofur was not associated with changes to β -lactam resistance genes, though cattle fed chlortetracycline had an increase in tetracycline resistance genes. Genes that were selectively enriched through culture and PCR were not identified through shotgun metagenomics suggesting these changes did not reflect changes in the entire fecal resistome.

Project type: Research, Scholarship, and Entrepreneurship

311 - Callie Paige Weldon

Fair Fiber: An Economic Mobility Model for Peruvian Alpaca Farmers

2017 Fall - College of Business

Peruvian alpaca farmers are living in poverty. Although alpaca fleece is highly valued, the average farmer receives only 3% of the market price for the fibers. The root of the imbalance lies in an oligopoly that currently exists in the industry. Two companies own 80% of the Peruvian alpaca population or 72% of the world population. They control pricing and are perpetuating the cycle of poverty for farmers and their families. Fair Fiber, a social venture, is out to disrupt the current model and build a sustainable, traceable, and fair-trade alpaca supply chain that values everyone involved in the process.

Project type: Research, Scholarship, and Entrepreneurship

312 - Rachel Claire West

Beyond Cancer: How Oncogenes Regulate Early Placental Development

2017 Fall - Biomedical Sciences

Oncogenes have a nasty reputation as cells that hijack healthy adult tissues, leading to unrestrained cell proliferation, suppression of apoptosis, and rampant cell invasion. These oncogenic processes cause tumor formation and poor prognosis cancer diagnoses. However, during early embryonic and fetal development oncogenes are crucial. Rapid cell proliferation, migration, and invasion are essential components in the development of a healthy placenta. There is a delicate balance between cell proliferation and cell differentiation in early placental development and oncogenes are essential in the maintenance of that balance. This project focuses on the oncogenes that comprise the LIN28-let-7-HMGA2 axis during placentation.

Project type: Research, Scholarship, and Entrepreneurship

313 - Chris Breck Whitehead

Experimental Investigation of Low-Order Nucleation across Catalytically Active Nanoparticles

2017 Fall - Chemistry

Recent literature for well-defined nanoparticle precatalyst materials indicates nucleation is low-order (first- or second-order) with respect to the precatalyst. This impactful claim is an important piece of the growing literature, which disproves the widely used Classical Nucleation Theory. The current investigation of other transition metal nanoparticle precatalysts, using Ir(I), Rh(I), and Pt(II) complexes, in conjunction with a smaller, less expensive stabilizer, HPO₄²⁻, is being conducted to determine the generality or low-order nucleation. The experimental work aims to find whether low (less than 3rd) order nucleation can be extended to other transition metal nanoparticle precatalysts beyond the most well-studied, prototypical systems.

Project type: Research, Scholarship, and Entrepreneurship

314 - Robert Thomas Patton Williams

Transcriptional Logic and Chromatin Accessibility in the *Caenorhabditis Elegans* Intestine

2017 Fall - Biochemistry and Molecular Biology

A major mechanism in cellular differentiation is chromatin-based control of developmentally important regions of the genome. Chromatin accessibility can restrict access of transcription factors to key regulatory regions in differentiating cell lineages thereby limiting their gene expression potential. To date, the nematode worm, *Caenorhabditis elegans* has been a model system for studying mechanisms of cellular differentiation. We propose that tissue-specific chromatin accessibility analysis in the adult intestine will reveal regulatory elements and transcription factors necessary for organ form and function. Performing this analysis will develop a methodology that will allow for investigation of tissue-specific regulatory cascades through developmental time.

Project type: Research, Scholarship, and Entrepreneurship

315 - Sere Anne Williams

Transcriptomics of *Oryza Sativa* under Drought Stress

2017 Fall - Biology

Over 546 million tons of rice are consumed by humans each year. Rice requires flooding for healthy growth, and drought reduces yield by 22 million tons. Plants' inherent sessile nature requires that they must respond to their environment as opposed to leaving it; thus, a crops' ability to effectively withstand unpredictable environmental conditions directly impacts our food stores. SR1, a transcription factor, regulates expression of over 3,000 genes in the model plant, *Arabidopsis thaliana*, during stress response. Molecular and genetic techniques, coupled with bioinformatics will reveal the action of this chief regulator in the world's second leading staple grain.

Project type: Research, Scholarship, and Entrepreneurship

316 - Robert Taylor Wimbish

Investigating the Nature of Ndc80-Mediated Kinetochores-Microtubule Attachments

2017 Fall - Biochemistry and Molecular Biology

During mitosis, force generation at the kinetochore-microtubule interface moves chromosomes to allow for equal division of genetic material into daughter cells. Here, we investigate the nature of stable kinetochore-microtubule attachments by mutating the key binding site of the kinetochore, the Ndc80 complex, and depleting human cells of a necessary component of the kinetochore's microtubule-binding machinery, the Ska complex. These experiments provide insight into the relative contributions of the Ndc80 and Ska complexes to kinetochore-microtubule attachment, and shed light on the mechanism behind the "hyper-tight" attachment phenotype of a previously characterized Ndc80 mutant.

Project type: Research, Scholarship, and Entrepreneurship

317 - Daniel C. Workman

Radiocesium Soil to Plant Transfers in Fukushima Forests

2017 Fall - Environmental and Radiological Health Sciences

Deposition of radiocesium following the March 11, 2011 accident at the Fukushima Dai-ichi Nuclear Generating Station occurred over surrounding land surfaces. Transfer factors for radiocesium to vegetation were developed for two species of understory plants by sampling soil and vegetation in four different experimental plots in impacted Fukushima forests. The vertical distribution of plant roots, radiocesium and potassium in the top 15-centimeters of soil were measured. The resulting radiocesium concentration and root distribution data provide the basis for a mechanistic interpretation of the soil-to-plant transfer factors and allow for improved predictive ability of radiocesium fluxes within the forest ecosystem.

Project type: Research, Scholarship, and Entrepreneurship

318 - Jennifer Worrell

Why Did You Do That? Luxury Brands Surviving Economic Crisis

2017 Fall - Design and Merchandising

The Global Financial Crisis of 2007-2010 shook the world. The luxury sector was previously thought to be impervious to economic decline because of its non-cyclical nature (Som & Blanckaert, 2015). However, research has shown that the luxury market was not immune to economic downturn (Halliburton & Kellner, 2011). Relatively few studies have been done about the luxury market brand management during times of economic crisis (Cavender & Kincade, 2014). This exploratory multiple-case study will seek to uncover how and why luxury fashion brand leaders choose brand management strategies during economic crisis.

Project type: Research, Scholarship, and Entrepreneurship

319 - Benjamin Conrad Wostoupal

Can Water Conservation Save Agriculture?

2017 Fall - Civil and Environmental Engineering

More than one-third of the global population lives in parts of the world that lack sufficient freshwater resources to support the needs of local populations. In many of these regions, rapid population growth has led to the reallocation of water from agricultural purposes to meet growing urban demands. Rural economies, dependent on agriculture, have suffered as a result. This study examines how water transfers affects rural economies and investigates strategies to protect such economies. Results are of widespread interest for the future health, security, and livelihood of agricultural communities throughout the world and the populations that depend on their productivity.

Project type: Research, Scholarship, and Entrepreneurship

320 - DeeDee Susan Wright

Developing Teacher Professional Resilience through Place Based Education and Mentoring

2017 Fall - Ecology

Historically in the US, some students are underrepresented in STEM fields. Quality STEM teachers can advance efforts to close these gaps. However, 17-50% of teachers leave within the first 5 years. The goal of the project is to develop resilient teachers by providing tools to be successful as they encounter a dynamic education landscape. This will be accomplished using a two-pronged approach of mentoring and place-based education curriculum. The proposed project will take a novel approach examining human interaction between teachers and the education community through a social ecological systems framework. We predict this model will increase STEM teacher resilience.

Project type: Research, Scholarship, and Entrepreneurship

321 - Lang Yang

A Handheld Electrochemical Sensing Platform for Point-of-Care Diagnostic Applications

2017 Fall - Electrical and Computer Engineering

The platform uses the electrochemical impedance spectroscopy (EIS) technique for pathogen detections. It includes sensor front end, stimulus generation, analog sensor data acquisition and conditioning, digital-to-analog conversion, back-end digital signal processing, wireless interface and a user phone app. The platform is powered by a USB based rechargeable battery at 3.3V. At an area cost of 28cm². An average error of 2.6% is achieved compared to commercial counterpart.

Project type: Research, Scholarship, and Entrepreneurship

322 - Neil David Yetz

Social Networks and Depression Prevention in a Youth Mentoring Program

2017 Fall - Psychology

Campus Connections (CC) is a service learning course at CSU where undergraduate students serve as mentors to at-risk adolescents in a group-based setting. Development of close relationships with other participating adolescents and mentors is a key component of the program. The purpose of this study is to determine if development of a strong social network at CC is associated with improved depression outcomes among participants. Adolescents who developed more robust social networks in the program had better mental health at the programs end. Results may be used to improve the well-established CC Program by incorporating more activities that encourage friendships.

Project type: Research, Scholarship, and Entrepreneurship

323 - Victoria Zablocki

Motor Impairments in Transient Ischemic Attack and Subsequent Stroke

2017 Fall - Health and Exercise Science

Transient ischemic attack (TIA) increases the risk for a subsequent stroke. Some individuals experience motor impairments during a TIA. The association between motor impairments during a TIA and the chances of a subsequent stroke has not been examined. In this meta-analysis, we examine whether the odds of a stroke are greater in TIA individuals who experience motor impairments as compared with those who do not. An odds ratio of 2.11 suggested that the chances of a subsequent stroke are increased by twofolds in individuals who experience motor impairments during a TIA compared with those individuals who have no motor impairments.

Project type: Research, Scholarship, and Entrepreneurship

324 - Luis Zambrana Gutierrez

Rice-Bran Supplementation Effects on EED Biomarkers and Gut Microbial Community

2017 Fall - Environmental and Radiological Health Sciences

Environmental Enteric Dysfunction in children reflects altered gastrointestinal functions affecting their normal growth and development. Maturity of the gut microbiota during infancy depend on dietary patterns, gut function and immune system development. Rice bran has demonstrated protection against EED. We hypothesized that daily consumption of RB promotes gut microbial diversity in weaning children. The identified changes in the microbial community structure of infants consuming RB compared with control group from 6 to 12 months old is described by changes in the mean abundances of taxa, and this support the potential benefits of RB supplementation in these children fighting against EED.

Project type: Research, Scholarship, and Entrepreneurship

325 - Haijie Zhang

Quadcopter Perching Based on Optimal Tau Trajectory Planning

2017 Fall - Mechanical Engineering

In the biological world, vision is vital for various kinds of insects, birds and mammals to survive. All these animals rely on vision to control their motion relative to the environment. Inspired by its biological performance, recently, tau theory has been developed to control the motion of robot motions such as landing, perching, braking, and docking. To widen tau theory's application, we designed an optimal reference tau to control the movement of the quadcopter, so that the fastest perching can be achieved based on the vision feedback.

Project type: Research, Scholarship, and Entrepreneurship